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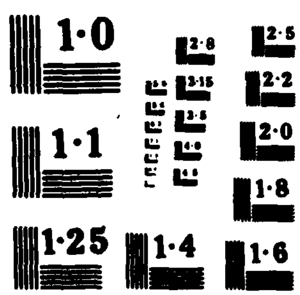
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Proceedings of the

Integrated Logistics Support Symposium

Hyatt Regency Hotel
Fort Worth, Texas
30 November-2 December 1983

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PROCEEDINGS

FROM THE

INTEGRATED LOGISTICS SUPPORT SYMPOSIUM

SPONSORED BY THE

AMERICAN DEFENSE PREPAREDNESS ASSOCIATION

IN COOPERATION WITH

THE SOCIETY OF LOGISTICS ENGINEERS

30 November - 2 December 1983

at the

Hyatt Regency Hotel
Fort Worth, Texas

THE SECOND ANNUAL INTEGRATED LOGISTICS SUPPORT SYMPOSIUM

PROCEEDINGS

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PREFACE

Time marches on - and so do Nations, people and technology.

Defense establishments must also change to keep up.

Ours has.

Equipment has become much more advanced technically and much more sophisticated.

Tactics have changed to make use of the new capabilities of equipment and to offset the changing threat.

People have changed, reflecting the urbanization and sophistication of society, thus adding a dimension to the changes required in training to accommodate new equipment, new tactic's and new training approaches.

All of the changes in combination have created a much greater requirement for reliable equipment and effective logistic support. Advancing technology and increased sophistication in equipment and tactics have, at once, increased the military dependence on logistic support and made the task greater and more complex.

Contributing to the depth of the logistics support problems of the US forces is the reduced readiness brought about by the underfunding of Defense during the Vietnam crisis and the reduction in Defense spending subsequent to the war.

Adding to the urgency of the problem is the fact that over the past decade, the Russian Armed Forces with larger budgets made significant improvements in size as well as technological development.

Not only has logistic support become more essential to combat success, it has become more and more financially significant as the operating expenses of new equipment dwarf acquisition costs over a reasonable period of useful life.

The cost of logistic support, in terms of budgeted dollars and military manpower, by itself, requires serious consideration of measures for logistics improvement.

The urgent need for increased emphasis on logistics support was uniformly recognized at the symposium by representatives of OSD and all the services. The unanimity of view and understanding was indeed impressive.

It was clear that the logistics support must go forward along three avenues. First, supportability of new equipment must be enhanced through introduction of integrated logistics support considerations during the statement of requirements phase of the development. (A classic example of what can be done was cited in the Army's T700 aircraft engine which was designed with supportability in mind).

Secondly, improvements in the efficiency of logistics systems must be pursued through funding of a positive logistics support R&D program. (It was noted during the conference that while there was agreement on the need, and while a small start had been made, there was some confusion among the services as to how this effort should be funded.) It was clear that log R&D deserves a place in the OSD Program and Budget system.

The third avenue brings in training. New, faster and more effective ways must be adapted to the training of operators and maintenance technicians to cope with the ever increasing equipment complexity and decreasing response time for mobilization or reaction.

Industry needs to be made fully aware of the requirements for ILS and adopted as a working partner in the effort to increase equipment durability and maintainability. In this process it must be made clear that suportability has taken its place on the priority scale with performance which they now perceived to be dominant. Ways must also be found to incentivize those who are effective in meeting the ILS requirements.

Industry must also be encouraged to enhance the quality of their products through increased care and through development of quality techniques applicable and appropriate for the new equipment now coming on stream. Particular effort is required to advance software quality technology.

One important area mentioned by industry representatives at the conference concerned feed back on the performance of their equipment in the field. This was considered crucial to reliability growth.

Technical publications, vital aspects of ILS, were addressed as being susceptible of improvement, not only in content, but in preparation and production. The latter, it was observed, could be enhanced by adoption of computer aided systems now extant commercially.

There were many detailed recommendations made during the panel discussions and by the panel chairman at the conclusion of the conference most of which supported and extended the general observations outlined above.

One recommendation that was uniformly supported was that the time had come for an extensive information effort addressed to the highest levels to make clear the critical importance of logistics support in today's defense environment.

A second related recommendation supported a follow on ILS symposium next year but with top management of the Defense Department and PMS as participants.

All in all this symposium was a success in establishing commonality of understanding within the Defense and Industry logistics community.

MG Chester McKeen, USA (Ret.)
Vice President, Procurement
Bell Helicopter Textron
Conference Chairman

Second Integrated Logistics Symposium
Keynote Address

"Current DoD Logistics Challenges"

by
R. D. Webster
Director, Logistics Planning
Westinghouse Electric Corporation
(Former Deputy Asst. Sec'y of Defense-Logistics)

Sponsored By:
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R. D. Webster
12/19/83

Good morning. I'm very appreciative of the fact that there are so many people here concerned about Integrated Logistics Support. In terms of our National Security -- the best offense is a good defense -- and innovative I.L.S. will help us achieve that aim. As you are aware, I'm no longer the Deputy Assistant Secretary of Defense, but I was happy to jump back into the fold as a substitute and come down here to talk about my favorite subject.

I've been in the Logistics part of the National Security structure for the last 15 years -- and I've seen a lot of progress in this area. I think progress is depicted today by the quality and size of the audience attending this meeting. You couldn't have gotten a crowd together like this ten years ago to discuss, not only Integrated Logistics Support, but the innovative approaches that we need to solve some of the Logistics problems we have today. So -- I'm really happy to be here -- happy to see a lot of my friends and some of my former staff; and I hope that my remarks are timely. The DoD Logistics Organization is still forging ahead with a lot of good initiatives, and trying to cope with one of the biggest challenges that we have in our National Security structure.

I'm also very happy to be keynoting for the jointly sponsored ADPA and SOLE organizations. I'm an active member of both of those organizations -- and from my experience in the Pentagon and in industry, I am convinced that both of these organizations have been very pro-active in supporting innovative Logistics concepts.

Our purpose here is to talk about Integrated Logistics Support with the emphasis on the innovative approaches that we need to solve our problems. I think we definitely have the right audience. I can see from the attendance that we've got the right people here to discuss the subject. So -- the mix of the crowd is right -- and I hope, as you proceed through the three days of meetings, that you're going to get an awful lot out of it.

The state of preparedness some three or four years ago, in this country, was pretty deficient. It was deficient for almost any conceivable scenario that you could develop for either a major long-term type war or a short-term war. There were a lot of reasons for this, and they do deserve mentioning. They're not our paramount problems today because most of these reasons have disappeared. Let me remind you again of how we got there. We went through the Viet Nam conflict with never really fully funding that effort. And what did that mean? That meant that the services were really "robbing Peter to pay Paul" to get through that conflict. But a lot of money was spent in that era. A lot of money was spent in the Logistics Support part of that era. It really drained the assets of our armed services.

At the same time that we were not fully funding Vietnam, we were in a relatively long period of a decline -- in real budget terms -- of the Defense budget. Eight of the ten years during the '70's the Defense budget was in a declining state.

These two things caused other problems. Our armed services morale was low. Our retention rate was low. These were caused by the fact that we couldn't adequately pay these people, and couldn't give them the quality of life that they deserved. The infra-structure that we had to house them, feed them, etc., was in a state of decay. And all of this caused us to be in a pretty bad state of readiness as we reached the beginnings of the current Administration.

Meanwhile, our adversary -- the Soviet threat -- whether their thrust was directed directly at us or through second and third parties -- was not standing still. The facts show that they were in a state of an average of three percent annual real growth in their Defense budget for the 20 year period preceding the current Administration. They were, in fact, out producing us in almost every category of weapon. They had vastly improved their weapons technology. This really hadn't been recognized until recently. They had done a pretty effective job of making their influence felt world-wide -- using the power of their military production to help other countries cause various types of problems throughout the world. So -- in summary -- our capability was decreasing, their capability was increasing -- and we had to do something about it.

So, our strategy at the outset of the Administration was to come up with a defense posture that would help us to effectively deter war. We were taking a position that the best offense is a good defense. If we have the capability to successfully deter any type of war, that would be sufficient to discourage anyone from trying to start one.

That basic requirement was met by our country wanting to do two things. First, we wanted to maintain nuclear parity with the Soviets. This objective gets daily airing in the newspaper with the SALT Talks and the other missile deployment issues which we are currently facing. The second objective -- and probably more important to this particular audience -- was that we needed to maintain strong conventional forces. When I use the word "strong", I don't quantify that in terms of number of people or number of arms because we know that the Soviets have maintained numerological superiority over us in terms of people and numbers of weapons. We have always had high technology and quality people in our favor. Building on this, we wanted to have a strong conventional force capability.

To get the strong conventional force capability, we needed to do three things -- all of which are very important logistics challenges. The first thrust is to get our armed forces in a high state of readiness. That's a people problem and we won't talk too much about that today. It's also a material problem -- the equipment that our soldiers, that our sailors, our Marines, and our Air Force people need must to be kept at a high state of readiness. Our troops have to have adequate training to be able not only to use the weapons, but to maintain them when they become non-operational. The second thrust was that, if we did get into tactical operations, we had to have a sustainable force. We had to have the capability of keeping them operating by replenishing spare parts and equipment. And then, of course, the third thrust was that we wanted to be able to carry our armed forces to the point of conflict. We needed deployable forces. We were going to move our forces as far as half way

around the world -- up to 12,000 miles. So needed to get readiness, we needed to get sustainability, and we needed to get deployability. That's what logistics is all about when it comes to conventional forces.

To do that, the Administration went in with a budget request that asked the American people to spend ten percent more in real terms than they had been spending before. And during the first budget year, it was accepted. Congress accepted it. I think the American people accepted that too. Most of all those Congressman got re-elected. That growth has continued -- not at the rate of ten percent -- but somewhere between five and eight percent in the succeeding years.

Specifically, what did it mean? In strategic modernization, the real growth increases in FY '81, '82, and '83 were 28 percent increase in '81; 29 percent in '82; and 45 percent in '83. You've got to agree that that's a pretty healthy increase in terms of total spending. If you look at the compound effect of those numbers, you can see that the money spent by the end of the third fiscal year had more than doubled. In the area of maintaining the strong, ready, and sustainable conventional forces -- and the goal here was that if we're going to war, you got to be ready today to fight that war. There is no lead time as General Miley's videotape will say, "We've got to be ready now." Thus, force modernization has have real increases of 12 percent in '81, 19 percent in '82, and 20 percent in '83 -- again, another healthy increase when compounded for the three year period. In the area of readiness, the increase FY '81 were 8.8 percent, '82 there were 7.8 percent, and in '83 2.7 percent -- again, real increases. As you can see they were not quite so

large as the strategic numbers or the force modernization numbers. In the area of sustainability -- although it varied somewhat from year to year -- the average was about a ten percent increase over that three year period.

Now, what's the bottom line of that Administration program? The bottom line is that it was an excellent start in making up for the decline that we had during the period of the '70's. We could predict the ability to maintain sufficient strength to be able to successfully deter any kind of a conflict. It also points out to you and to me that the future logistics support challenges are going to be greater. There's a bow wave coming in their forecasts for the out-year support. With all of the equipment that we're adding and all of the equipment that we're continuing to retain -- add those two together and you have a compound logistics support problem. I think we ought to look at that as an opportunity. It means that we've got more equipment to support, and we've got a lot more high technology to contend with in the inventory that we're adding. As I recall before I left the Pentagon, I believe the value of the inventory equipment in our armed services exceeded $200 billion. And that's the procured cost not the replacement cost. We were forecasting, I think, that we were continuing to add about $10 billion a year worth of new equipment to that $200 billion. And we were also forecasting we weren't throwing too much of the $200 billion worth of equipment away. That really presents a challenge. If you look at the total percentage that's called "logistics" in the DOD budget, you'll find that today it's running about one third of the total DOD budget. In terms of today's dollars, we're talking about $80 billion a year. If we look into the FY '85, '86 time frame,

I think you will see something that's never occurred in this country -- we're going to have a logistics budget of over $100 billion! That's a lot of money, but we're going to need it.

More importantly, we're going to have to solve some of our logistics support challenges to keep that number from getting to a point of unaffordability. We know it's going to take more dollars to support the forces, but it's going to take many innovative logistics techniques and procedures to keep that number down and do an effective job at the same time. And that's why we're here today. So, this meeting is very timely. And with the audience that we have and the panelists we have, I think we'll have the time to explore all of these various problems that we have in this $100 billion problem. We're going to try to make our support more affordable. At the same time that we're going to try to do this, we've got to cope with a future diminishing personnel probability.

Our long-range forecasts are showing that the number of enlistable age people available through the 1990's is going to continue to drop. Which means that the military and the industrial base will be competing more strenuously for the younger people. Younger people are going to cost more money. And that means that we're going to have to absorb more personnel costs. We're going to have to do a better job training them. They're going to come to us with better educational levels -- we've already learned that. But we will still have the high technology weapons training problems to cope with. We're looking to the future. We're really serious about looking as far out as the year 2000 so that we can develop today the policies and the budget forecasts that we need to keep us out of trouble and to improve our readiness and sustainability.

At the beginning of the Reagan Administration, when Secretary Weinberger and Deputy Secretary Carlucci came on board, there was a task force put together to take a look at the acquisition structure in the Department of Defense. This task force led ultimately to what we call the "32 Carlucci Initiatives." They were focused primarily on solving the problems that we had in our acquisition structure, methods, and contracting. They even included readiness in support ideas. I had the privilege of being part of an industrial team that worked in cooperation with the Carlucci initiative team during the Spring of '81, and I recall the difficulty of trying to motivate that industrial team to talk about a logistics initiative. The final industrial team submission had one -- out of ten -- having something to do with logistics. Nine had to do with RDT&E and Procurement. However, the in-house team had a little bit greater success under the leadership of Russ Shorey. Six of the 32 DoD initiatives had to do with Readiness and Support issues.

Two months later I accepted the appointment as the Deputy Assistant Secretary for Logistics. I took the effort that had been done in the Carlucci task force and augmented that with several industry initiatives and came up with what is now a series of nine DoD logistics initiatives. I'd like to review these briefly with you today because I think they set the stage for many of the discussions that will follow in this meeting.

The first initiative was the development of a Logistics Long-Range or Strategic Plan. We, who had come from industry into the Department of Defense, were used to doing long-range and strategic planning. That's the way we kept our companies alive and viable. Our plans looked out 10 to 15 years

-- and we tried to analyze our competition and come up with a successful strategy to win in a competitive environment. It was easy for us to recognize that DOD could do this too. Lo and behold, I found that Long-Range Planning was not new to the Department of Defense. One of my predecessors had created logistics long-range plans some ten years previous. The only problem with it was that it was a thick unreadable document, which ended up in a file cabinet and was never again seen after its original release. And we in industry had learned that plans have to be <u>dynamic</u> -- you have to use them everyday, you have to update them as the situation changes.

When we started out the plan, we said, a. we're going to have a readable document; b. it's going to look out 20 years in the future; and c. it's going to be dynamic. We're not going to shelve it when we finish it. It's going to set the stage for everything that we need to do in the budget structure or in organizational structure of the future. After some two years in office, my organization finally published a strategic plan. One of the presents that they gave me at my farewell party was one of the first copies that came off the printing press. The Long-Range Logistics plan for DoD is now available from the Office of the Secretary of Defense. The Logistics & Material Management Organization has prime responsibility for it under a gentlemen named Brad Berghman. He is now staffed to keep that plan alive and well. At the same time as OSD was doing this, we were talking to the services about doing the same thing. The Air Force had already started. Their plan was one or two years in being ready. The Army and the Navy also agreed to get active in this area. In any event, the DOD guidance in the plan is that the services should each have a logistics long-range plan in support of the OSD plan. One of the main reasons why we made this plan short and readable was that we

wanted to communicate to as broad an area of the National Security base of this country that we could. We want everybody to be involved in the plan, so we left out all the classified data, and we left out a lot of the numbers. Our contention is that if you get sufficiently interested in some aspect of that plan, you go to OSD, and they'll show you the numbers of the data. All the other initiatives will all focus in one way or another on initiative number one, the Logistics Long-Range Plan.

The second initiative, and the one closest to the front-end planning aspects of the logistics problem, is Logistics Research and Development. This initiative, when first presented to Dr. Delauer, was accepted immediately without reservation. In any event, in '81, we had full approval to have a Logistics R&D program. And again, at least one of the services had already been active in trying to do that. The Air Force had started a program and they will be discussing the progress they've made in the last three years. The purpose of the Logistics Research and Development program is to give the technical direction required to make the long-range plan work. In other words, we logisticians need to become technically competent in all logistics areas.

Technology has been accelerating in weapons development. You've all seen the acceleration in the technology of the electronic chip area. It is literally driving every weapons procurement program today. It's obvious that every Integrated Logistics Support plan in the future must cope with that accelerated technology. You've got to get in early to solve the technological

problems. You can't wait until the weapon is developed and is going to be deployed. You just won't have the time. You'll have a logistics short-fall that will make the weapon non-operable.

The third initiative is called Readiness and Support. What we did was to combine the six original Carlucci Readiness and Support initiatives into one. Since Paul Thayer only likes to deal with five or six key things at a time, we boiled all six down to one, so that it could be included as one of his six acquisition initiatives. It does include the essential elements of the six original 32 Carlucci initiatives. The focus of the Readiness and Support initiatives was first to set realistic readiness objectives for weapon systems at the very front-end of the design process before pencil is put to paper. That might sound tough to do -- and we didn't say it was going to be easy -- but under the leadership of Russ Shorey and his Weapons support people, we have come up with methods to do that. The services are now doing that on all their new starts and in many cases they are backing-in on programs that have already gone beyond the new start phase. Then we're going to measure those while we develop the system so that, when we make that ultimate production decision, we will have some degree of confidence that when that equipment is deployed it will achieve the readiness that is required. That initiative is off and running. Although it's very tough to do, I think we've been making good progress. We've been holding symposia on the technology required to set an objective and the technology required to assess where we stand as we go through the design process. I think, as you see the new weapons deploy, they're going to be in much better shape from the standpoint of usability, deployability and maintainability.

The fourth initiative is the subject of one of your panels -- Post-Production Support. It had been industry's position going back to the middle '70's that something was wrong with our management process. We were doing a pretty effective job of getting a weapon through the development process and into the deployment, but when the ultimate time came when the manufacturer had to close his production line because a new production start was coming down the pike, the management of that weapon system as a system disappeared and it went into the functional management areas of the services. Now, it wasn't a criticism of those people that we got into trouble; as a functional manager they were doing a good job of managing the spares or managing any other logistics element. But the total weapons program focus got lost, and that led us into a position where we were making reactive spares procurements -- and we were having diminishing manufacturing sources. We were getting spares requirements for which we had no one to build the spare parts. No one had thought about how to maintain open production capability to do spares. Our first-line weapon systems were involved. Our very first-line tactical fighter three or four years ago was the F-4, and it was out of production. The Air Force, the Navy, the Marine Corp, and 13 of our allied countries had F-4's. At that time, there were almost 5,000 of them in existence, and we couldn't even find somebody to build the spare parts for some of the more critical parts of the radar system. Well, I'm happy to say that Post-Production Support got recognized as a formal DOD program -- all the services are doing it. It's recognized in the current OSD policy on acquisition. The OSD staff, again in the Weapon Support area, has set up a special group to help determine the methodology of doing this, audit the performance of the services and get effective control on these many first-line weapons that are currently out of production. I think you'll talk a lot about that during this symposium.

Number five is Supply Management Improvement. That might bring some smiles to your faces because of these $800 wrenches and the $1,000 screw drivers DoD has recently bought. This is not the focus of the Supply Management initiative. The Supply Management initiative is like the other initiatives. It's an open, creative, innovative look at what the management problems are. What are the real management problems and how can we correct our management deficiencies. We know, for example, that the large percentage of the dollars that go into the supply part of our budget go in there for those high value repairables and consumables that are used in our tactical weapons. It's not the bits and pieces. The bits and pieces are important, but that's not where we're spending most of the money. We're spending 80 to 90 percent of the money in those high value items that, for reasons of affordability, we're stuck with basically a sole source situation. We have to get them from the company that we paid to design it and to produce it. What we haven't been doing is doing an effective job of using good procurement practices. We haven't been using economical ordering quantities. We have yet to really use the multi-year procurement thrust in that area. And we're doing a bad job of managing the acquisition and the inventory control of those items. The real focus is what do we have to do in terms of policy and procedure to get the cost of those spares down and yet maintain or improve the quality of those very expensive spare parts so that we can not only reduce the size of the supply budget, but we can improve the readiness of our equipment.

Number six is an initiative called International Logistics. The focus of International Logistics is to really take some of the initiatives that we're using in-house for our own equipment and make sure that our allied governments, who are buying this equipment from us, are getting their fair

share of the improvements that we're making. It used to be said in many of the service spares procurement procedures that allied governments sort of got on a waiting list. They didn't have the priority that they might need in case of any kind of a conflict. One of the first things we're looking at in the area of International Logistics is to make sure that when there is a strategic or tactical scenario where one or more allied governments would come to play, we would have an adequate priority system to see that everybody got their fair share of the assets. Again, if I go back to the F-4 situation and talk about the 2,000 that we still have in our inventory and the other 1,000 that are in their inventory, we find that many of the scenarios that we're looking at today would be using both inventories. Therefore, we need a priority system to keep those F-4's in a state of readiness.

We also know that the way of doing business with our allies in foreign military sales has changed drastically. It used to be that after we procured something for ourselves, it was made available to the allied governments. But with the allied governments that have a high degree of technical competency today -- and that includes most all of the European countries, Australia, Canada, Japan, etc. -- what we find is that they're getting involved in co-production. They're helping us produce for many reasons. Some of them are, economic -- to make the sale cost effective to themselves. Some of them are even getting involved in co-development of the system. Their designers are sitting down with our designers to design the system. That doesn't make our job as logisticians easier, because that now forces us as logisticians into a world-wide logistics support environment for procuring and managing logistics support. The International Logistics thrust is to get a hang on those basic problems and make sure that we give adequate priority, because the

$100 billion number that I talked about is only for the support of the U.S. Forces. It does not include the other billions of dollars that we receive from allied governments to augment their support.

Initiative number seven we call Industrial Base Management. And again, there's a high degree of synergism between all of these initiatives; they're very interactive. The focus of the Industrial Base initiative was to do something about these production lead times in an emergency. We know we don't have the lead time available to us to adequately prepare for some of the war scenarios, but we've got to do something about it. What we're doing as logisticians, in conjunction with the procurement people in OSD, is working with Sol Love and his Industrial Mobilization Task Force to develop mobilization and surge exercises where we can actually exercise the industrial base. ADPA is very proactive in helping us carry out one of the first of a series of exercises where we will be developing tactical and strategic scenarios and then trying to test the industrial base on paper for the capability of not only producing the required number of end items in the required lead time, but producing the logistics support that has to go with them. Obviously we're going to come up with answers that say you can't do it. We know that. But what we want to know is why can't we do it. And is there something that we can do to eliminate the problem resulting from not being able to do it? We're getting some very good input from the industrial base. I had one person full time on this, and I would say that as DoD got deeper into it, we will probably staff it a little more.

Initiative number eight had to do with Logistics Productivity. This is the one initiative that hasn't gotten quite to the point I wanted it to, but let me tell you what the thrust is. The thrust is that no matter what we do in the area of logistics -- whether it's developing support for new weapons or handling operational support problems out on the field -- we can measure the effectivity of the job that we're doing. We can either do it in numerical or financial terms. How much money are we saving -- or how much improved readiness are we getting? And either one of those measures is valid as far as I'm concerned. The point is, we haven't been doing much measuring -- real measuring -- of how well we're doing with the money we're spending. So the focus of the productivity effort is to start to measure all logistics activities and then look for areas where by spending logistics R&D or investment money we can do a better job.

And the ninth of the nine was Logistics Management Development. Our purpose here today is an example of the need. Technology is rapidly accelerating; the world is changing; the mix of weapons systems is changing. The problems are all becoming more complex, and what we haven't been paying adequate attention to is keeping our logisticians trained and educated to cope with this problem. We've got a multi-pronged approach going -- starting with the Defense Management College -- and working down to the service schools to upgrade logistics management education. We want our Deputy Program Managers for Logistics to talk to their program manager and develop an acquisition logistics strategy for weapons that's really going to save us money and get us higher states of readiness. The Management College has already put on their first of a series of management training programs. I attended the whole

course; the quality is excellent. The suggestions we got from our senior services logisticians who attended was sufficient to tell us to go back there and revamp and improve that program, and it's going very well. I think the services will pick up on this and start to improve the quality of the logistics management training their doing.

Let me now just finish up with a few comments on Logistics R&D. We have two problems to worry about when we put together a logistics R&D budget. The first and the most obvious to us weapons systems people is that we've got to get logistics earlier into the front end of weapons development -- both on specific weapons and generic weapons logistics problems. We've got to do a better job in reliability, maintainability, and supportability assessment during design. We've got to do a better job of eliminating technology gap in the developing of ILS elements -- particularly things like support and test equipment and manuals.

If you read the Wall Street Journal this morning there was a little bi-line in there that one of the home computer people was in serious trouble because of returns of his product. What was wrong? Was the product defective? No, the manuals were defective. That was part of the Three Mile Island problem -- not that the product went bad but the training; the tech manuals that went with it were bad. And we've got to learn how to improve quality of Logistic Support -- do a better job and a more cost effective job. And we've got to look for maintenance improvements on our existing weapons. We're not satisfied with

saying that even though we're going to keep the F-4 in inventory, through the year 2000, that we're going to keep that configuration in inventory. If there's a way that we can improve that weapon to reduce its lifetime support cost, we're going to do it. And we're going to spend logistics R&D money to see that it happens.

The other area is this area of Logistics Operations. In addition to planning for generic weapons and specific weapon systems, there's a vast logistics infra-structure out there a vast DOD supply system, a vast DOD maintenance system, and a vast DOD transportation and distribution system. Don't forget that when I talked about challenges in the beginning, I said deployability is a tremendous logistics challenge. And even though it doesn't relate directly to weapons system development it certainly is going to help us get a lot of those weapons there. We've got to worry about our transportation system. We've got to worry about training of our people -- particularly operations and maintenance training.

Now, with those two thrusts, the logistics system modernization and weapon systems development I think we're off and running on a good R&D program. Let me tell you how it looks in the Pentagon today. In '81 we got Delauer to agree -- in writing by putting it in his R&D State Of The Union Address to Congress -- that logistics R&D will be a formal part of the total DOD R&D structure. Now, we weren't asking for a different program, and we didn't want it necessarily totally set aside as a separate managed item. We wanted it recognized that some portion of the RDT&E budget would be spent on improving reliability, maintainability, and supportability not only within DOD but out in the industrial base. We put together a logistics R&D policy

council, which in my former job as Deputy Assistant Secretary, I co-chaired with Dr. Edith Martin, who was the R&D Deputy Undersecretary. We set up service logistics R&D focal points. Each of the services has identified those people, and some of those people are here with us today. We started to put budget inputs in and have them identified.

We've had problems with this. Any time you try to do something new and different, somebody gets suspicious. The services get suspicious; the R&D community gets suspicious; Congress gets suspicious. And we've been trying to work the problem by telling those people what we're trying to do. Once we tell them what we're trying to do, we usually don't get any serious objection. When a new idea comes up, it takes a while for it to be ingested by the infra-structure.

The next thing that we did was look at all of the RDT&E money. At that time, we were looking at about $3 billion worth inside DoD. There's another $3 billion worth of Independent Research and Development spent in industry; and what's going on out there? We found that their proportion of money spent on Logistics R&D was a lot lower than we thought if should be considering the amount of sales that the industrial base was getting for logistics support. So we got Dr. Delauer to write a letter to tell the IR&D Policy Council and industry that we think that this is an area of special emphasis for the next few years. Industry ought to look at their IR&D programs and increase the amount of money that they're spending for Logistics R&D. The current IR&D

monitoring teams are stressing this today. I'm happy to say that many of the companies picked up on this very quickly. There were a few people out there that were doing a great job. I say a few; there weren't many. But I see now that there are probably ten times as many companies with very well defined logistics R&D programs as there were three years ago.

If you look at the money that we're spending in logistics today -- that $100 billion number -- and you take out the in-house work, the rest of it is spent out in the industrial base on this country. We need a viable industrial base to take care of both the peace time and the potential war time requirements. We've got to make sure that the industrial base is an integral part of this planning. On weapons support, I think we have come a long way. We've got industry associations that are helping us out. We've got a good dialogue going meetings like this. There are other industrial bases that we're not so good on -- the other supplies and services that we need. So, we're working very hard to get these other industrial bases involved in our problems -- transportation,, for example. Most of our transportation is done by the commercial sector, not in-house. We need them badly in many of our surge and mobilization requirements.

In summary then, I think that, if I were looking at investing dollars to get return on the DOD budget today, logistics R&D is probably the highest payout area. Whatever you can do to improve the reliability, maintainability, and supportability of the weapons and anything that you can do to improve the logistics infra-structure is a logical subject. I think the best way to keep our conventional forces in a high state of total readiness is to work on

weapons readiness. We've got higher calibre people coming into the service. We have higher retention rates now partially because of the economy, but partially because the all volunteer force concept is working The percentage of high school graduates has increase quite a bit. We've got to train those people to do the job. But we've got to give them good equipment, and we've got to be able to keep the equipment in a good state of readiness.

All that you have to do as individuals is listen to what everybody has to say today and set yourself a personal goal of taking at least one good idea home to your base or your company to get something going in innovative logistics. If we can all take that, I think we'll get a big start on improving this ILS problem.

With that, I'll end my talk and say have a good meeting.

Session II

EMERSON CALE
ASSISTANT DIRECTOR FOR LOGISTICS PROGRAMS & ASSESMENTS DIVISION
OFFICE OF THE CHIEF OF NAVAL MATERIAL

FRONT END LOGISTICS

LOGISTICS SUPPORT ANALYSIS (LSA) TRAINING
HARDMAN - MANPOWER
LOGISTIC REVIEW GROUP (LRG) AUDIT AT MILESTONE I

SMALL SYSTEMS

ACAT III TO IV PROGRAMS
LRG AT MILESTONE I, II, III.
AUDITOR QUALIFICATION PROGRAM

FOLLOW-UP INTO FIELDING

LOOK - BACK STUDY
4TH AUDIT AT IOC
AVAILABILITY CENTERED INVENTORY MODEL (ACIM)
DART/SEER

PEOPLE

EXPANDING LOGISTIC INTERN PROGRAM
SCHEDULE "B" HIRING AUTHORITY
ILS TRAINING CURRICULUM
  13 NEW COURSES
  GMU NEGOTIATION

FUNDING CONTROL

INSTITIUTIONALIZE STANDARD FORMAT
BUILDING BLOCKS IN POM/BUDGETS
TESTING 44 PROGRAMS POM 86(BAM)

VINCENT J. WALLS
ASSISTANT DEPUTY CHIEF OF STAFF FOR
INSTALLATIONS & LOGISTICS
HQ USMC

II. ILS POLICY

My objective today is to discuss the various aspects of ILS policies and implementation within the Marine Corps. While I look at all of us as being family members striving for the same goals, we have natural differences in our own perspectives. In the process, I hope to give you an appreciation for our acquisition organization, which I believe differs significantly from our larger sister Services.

The Marine Corps, as do all the Services, places great reliance on industry in obtaining the desired weapon system, with its logistics support. The Marine Corps uniquely relies heavily on the other Services for acquisition and ILS support. Notwithstanding this reliance, we are very active in developing ways and means to ensure that the ILS activities produce the best results for the dollars appropriated to the Marine Corps in terms of systems availability and life cycle costs. The environment in which the Marine Corps operates forces us to know how the other Services apply their policies. We all follow the DOD ILS policies, but as is often the case, implementation provides the greater challenge in interpreting and applying those policies. At this point, I'd like to present to you the methods by which the Marine Corps acquires its systems.

- In the first category are the acquisitions which the Marine Corps performs totally in-house; that includes the development, ILS contracting, etc. These programs are usually the smaller and simpler items, and comprise about 10 to 15% of all the Marine Corps acquisitions.

- The second are those larger and more complex programs for which the Chief of Naval Material provides support to the Commandant by assigning principal development activity responsibility to one of the Navy System Commands. Examples - NAVELEX TPS-59, NAVSEA LVTP7. In this relationship, the SYSCOM undertakes the management and technical responsibility for development as well as contracting, while the Marine Corps is responsible for ILS planning and management.

- The third method is joint programs. Although DOD 5000.1 requires that joint programs operate under the policies and procedures of the lead component, the difficulties in integrating each Service's differing requirements are familiar to most of us. The differing requirements are generated from essentially different operational mission scenarios. This can create the need for performance and logistics requirements which vary substantially from the needs of the other participating Service.

MATRIX ORGANIZATION

Next, let me stipulate we have no program management offices, per se. For every program, we form an Acquisition Coordinating Group -- in essence a matrix format. Each ACG is made up of an

Acquisition Program Sponsor ...
A Development Coordinator ...
A Development Project Officer ... and
An Acquisition Project Officer ...

In addition, the ACG is augmented as necessary with special skills, for example - cost analysis, training and manpower.

To scope the magnitude of what we handle, we have approximately 60 Acquisition Project Officers (which the other Services call Integrated Logistics Support Managers) supported by some 75 logistics element managers in the various disciplines of ILS. We can credit about 500 programs (in all procurement modes) for keeping these professionals busy.

In our everyday work with these programs, we find refinements are needed in the translation of the operational requirements to the ILS Statement of Work and its interpretation. The contractual work requirements <u>must</u> be clearly laid out to ensure understanding by all concerned. Specificity and clarity are significant contributors to the overall success of ILS <u>and</u> bringing the program on line with adequate support.

Our current policy is to require performance of the logistics support analysis on each program at the earliest phase we can. But we have experienced situations both internally and with industry where more work, training and commitment are needed to implement LSA as envisioned by DOD. I'll return to the point.

In a real sense, our interaction with sister Services in the acquisition of our weapons and equipments is an advantage. We've become familiar with the many facets of ILS within and out of the Marine Corps and appropriately tailored ILS policy in our own document, MCO 4105._.

In anticipation of DOD 5000.39, our document is being revised with particular emphasis on

- Early identification of ILS planning and requirements in the front-end.

- The application of LSA, again, early in the acquisition.

- Making ILS test and evaluations a part of the operational test and evaluation and feedback system.

- Early involvement of our weapon/equipment support managers to assure orderly and effective post production support.

- And an initiative leading to a disciplined approach to identifying an ILS funding profile.

My objective today was to provide information on what we the Marine Corps are doing in ILS and LSA. I mentioned earlier that implementation was the greater challenge. That challenge is half ours and half yours. I would be remiss in closing without some remarks on what private industry can do. I mentioned earlier we, government and industry, need more work, training and commitment.

First, we need your commitment in logistics from the same day the design is started.

Secondly, more work - because of the sophistication of the new weapon systems, steps must be taken to seek ways to reduce logistics costs. We look forward to recent initiatives in logistics R&D in helping in this area.

Thirdly, we need to maximize the interface between the engineers and logistics managers.

Fourthly, as is the case with professionals in any field, as logisticians, we need to train harder ...

and finally, to achieve ILS and truly implement it, we must emphasize ILS from the highest levels. This emphasis must come from the top, the Chief Executive Officers and Division Managers, and ILS must be stressed to all management levels right down to the person doing the job. In the past, top management both in government and in industry, has not always given sufficient priority to ILS and its influence on design. We have talked a good story about supporting logistics, but in the main, only if it didn't get in the way of cost and schedule. Much of the support of our new systems is good and the laurels are justified, but the need and the challenge are still there, and will remain there. Many of us in this room can be instrumental in truly achieving system readiness goals at affordable costs by our dedication to sound ILS practices. The policies are in place - we now need to execute.

It's good to be with you. Thank you.

INTEGRATED LOGISTICS SUPPORT IN ARMY MODERNIZATION

LTG RICHARD H. THOMPSON

DEPUTY CHIEF OF STAFF FOR LOGISTICS
DEPARTMENT OF THE ARMY

THANK YOU GEN MCKEEN. GREAT PLEASURE TO BE HERE THIS AFTERNOON AND PARTICIPATE IN THE SECOND ANNUAL ADPA INTEGRATED LOGISTICS SUPPORT SYMPOSIUM.

PROVIDES AN OPPORTUNITY TO INCREASE DIALOGUE BETWEEN INDUSTRY AND THE SERVICES ON IMPORTANCE OF ILS IN SYSTEM ACQUISITION

DON'T WANT TO PREEMPT OTHER SPEAKERS BUT...

I WANT TO LAY A FOUNDATION FOR THEIR REMARKS BY SPEAKING TO ARMY MODERNIZATION.
AND THE IMPORTANCE OF INTEGRATED LOGISTICS SUPPORT TO THAT PROCESS.

ARMY'S RATE AND SCOPE OF MODERNIZATION IS GREATEST SINCE WORLD WAR II...

REPRESENTS CHALLENGES NOT ONLY TO LOGISTICIANS...BUT FOR TOTAL ARMY AS WELL
MUST RECOGNIZE WE MUST CONCURRENTLY PLAN, PROGRAM AND EXECUTE
ILS IS PIVOTAL TO THIS EFFORT

IN THE NEXT 10-15 MINUTES, I WANT TO SPEAK ABOUT
WHATS HAPPENING
WHAT WE'VE LEARNED
WHAT HAVE WE DONE
WHAT ARE WE DOING
WHAT ELSE NEEDS TO BE DONE

FIRST, WHAT'S HAPPENING

WE KEEP TALKING ABOUT 380-400 MODERNIZATION ITEMS...

I'M TALKING ABOUT OVER 176,000 NEW PIECES OF EQUIPMENT TO BE FIELDED DURING THE NEXT TWO FISCAL YEARS... FROM 4 OF 5 DARCOM COMMODITY COMMANDS.
RANGE FROM MAJOR SYSTEMS SUCH AS THE M-1 AND THE SGT YORK DIVISION AIR DEFENSE SYSTEMS TO SMALLER SYSTEMS SUCH AS LIGHTWEIGHT TACTICAL RADIOS
IMPACT ON A SINGLE DIVISION IS MAJOR...

2,300 ITEMS DELIVERED DURING A TYPICAL QTR TO AN ARMORED

DIVISION.

IN FISCAL YEAR 84 AND...
800 ITEMS WITHDRAWN

MODERNIZING NOT ONLY IN TERMS OF WEAPON SYSTEMS, BUT AS IMPORTANT TO ILS IS THAT WE ARE CONCURRENTLY CHANGING OUR MAINTENANCE CONCEPTS TO SUPPORT THE MODERN BATTLEFIELD

EXAMPLE:

THREE LEVEL MAINTENANCE CONCEPT
TYPES AND LOCATION OF TEST MEASUREMENT AND DIAGNOSTIC EQUIPMENT ON THE BATTLEFIELD
MAINTENANCE OF HIGH TECH WEAPONS WITH SOPHISTICATED FIRE CONTROL SYSTEMS

ANOTHER CONSIDERATION IS THAT A LARGE NUMBER OF NEW SYSTEMS WILL BE ACQUISTED AS COMMERCIAL OFF-THE-SHELF OR AS NON-DEVELOPMENTAL ITEMS
THE RESULT WE, ALL OF US - LOGISITICIANS, DEVELOPERS AND SUPPLIERS WILL HAVE LESS TIME TO PLAN, ACQUIRE, EVALUATE AND DEPLOY LOGISTICAL SUPPORT SYSTEMS

WE WILL BE FIELDING SYSTEMS USING AN EVEN NOTE RAPID AND COMPRESSED ACQUISITION STRATEGY...
EXAMPLE: QUICK REACTION PROGRAMS AT THE 9TH INFANTRY DIVISION
COMMERCIAL EQUIPMENT (SUCH AS MOTORCYCLES) PURCHASED AND FIELDED IN ONLY 6 MONTHS

DEMANDS UPON THE ARMY AND INDUSTRY FOR VIABLE AND RELIABLE ILS SYSTEMS ARE UNPRECEDENTED.
MUST REMEMBER THAT ILS DOESN'T STOP AT FIELDING NEW SYSTEMS, CONTINUES BEYOND INITIAL FIELDING AND INCLUDES SYSTEMS THAT NEW ONES WILL DISPLACE
REMEMBER THE 176,000 PLUS ITEMS I SPOKE ABOUT EARLIER?
THOSE NEW FIELDINGS WILL CAUSE RIPPLE EFFECTS IN TRANSFERRING DISPLACED SYSTEMS WITHIN AND BETWEEN MAJOR COMMANDS AND VARIOUS COMPONENTS.

DISPLACED SYSTEMS REQUIRE ILS SUPPORT AS WELL - A DIFFERENT SET OF PROBLEMS MUST LOOK UPON DISPLACED SYSTEMS AS IF THEY WERE NEW SYSTEMS FOR THE GAINING COMMANDS

NEXT WE'VE LEARNED A LOT FROM THESE EXPERIENCES

WE'VE GOT TO START ILS PLANNING EARLY IN EVERY DEVELOPMENT PROGRAM AND THE LOGISTICIAN MUST CONTINUE TO BE INVOLVED AS THE SYSTEM MOVES THROUGH THE PROCESS

EARLY PLANNING MUST INCLUDE ALL PARTICIPANTS: LOGISTICIANS, ENGINEERS, FUNCTIONAL SPECIALISTS, TRAINERS AND USERS
YOU KNOW THE CONSEQUENCES OF LATE PLANNING...ALL HAVE HEARD HORROR STORIES:
LONG LEAD TIME ITEMS NOT AVAILABLE IN THE QUANTITIES WE WOULD HAVE LIKED TO HAVE HAD:
SPARES WITH PART NUMBERS RATHER THAT NATIONAL STOCK NUMEBRS WHICH MADE PARTS REQUISITIONING CUMBERSOME FOR THE SOLDIER AND THE INVENTORY CONTROL POINTS
WE HAVE LEARNED AN OLD LESSON. WE DO MORE HARM, THAN GOOD WHEN WE FIELD SYSTEMS WITHOUT A COMPLETE SUPPORT PACKAGE

BOTTOM LINE: WE WILL NOT FIELD SYSTEMS WITH INCOMPLETE SUPPORT PACKAGES. THE FIELDING OF SYSTEMS UNDER WAIVER WILL BE SHARPLY REDUCED.
THIS LEADS ME TO CONTRACTOR LOGISTICS SUPPORT AND GO-TO-WAR CAPABILITY

CONTRACTOR LOGISTICS SUPPORT IS OFTEN THE WAY TO GO, ESPECIALLY FOR ACCELERATED PROGRAMS... BUT WE MUST PLAN AND PROGRAM WHERE IT MAKES GOOD SENSE FOR THE EARLY TRANSISTION OF SUPPORT STANDARD ARMY SYSTEMS

PROTRACTED CONTRACTOR LOGISTICS SUPPORT MEANS WE MUST CAREFULLY EVALUATE AND RECOGNIZE THE NEED AND THE NECESSITY TO PLAN TO SUSTAIN A WEAPON SYSTEM IN WARTIME. THE KEY POINT IS CONTRACT LOGISTICAL SUPPORT MUST BE PLANNED AFTER AN ECONOMIC AND OPERATIONAL RISK ASSESSMENT FOCUSING ON WARTIME DEPLOYMENT REQUIREMENTS.

ANOTHER LESSON LEARNED IS THAT WE NEED TO LOOK BEYOND THE PRIME WEAPON SYSTEM TO SUPPORT SYSTEMS AND ASSOCIATED END ITEMS.

FOR EXAMPLE, A WEAPON SYSTEM IS OFTEN THE SUM OF MANY PARTS - NOR DOES IT STAND

WE MUST CONSIDER
- SPECIAL TOOLS
- MANUALS
- ORGANIZATIONAL SUPPORT EQUIPMENT
- TRAINING DEVICES
- INDIVIDUAL TRAINING
- ASSOCIATED SUPPORT ITEMS OF EQUIPMENT
- TEST MEASUREMENT AND DIAGNOSTIC EQUIPMENT
- BASIS OF ISSUE PLANS
- REPAIR PARTS
- AND SPARES

BEYOND THIS, MUST IMPACT ON NON-DIVISIONAL SUPPLY, MAINTENANCE AND OTHER SUPPORT UNITS

MUST ORCHESTRATE DEVELOPMENT, TESTING AND DEPLOYMENT OF THE TOTAL LOGISTICAL SUPPORT PACKAGE IN SYNCRONIZATION WITH END ITEM DEVELOPMENT SCHEDULE

WHAT HAVE WE DONE ABOUT THESE LESSONS LEARNED?

THE ILS MANAGEMENT PROCESS HAS BEEN INTENSIVELY REVIEWED FROM THE DEPARTMENT OF THE ARMY LEVEL DOWN

POST FIELDING REVIEWS CONFIRMED:
ILS, WHEN BASED ON A SOLID STRUCTURE WITH STRONG MANAGEMENT PRINCIPALS APPLIED AND PRACTICED, CAN SATISFY THE LOGISTICS CHALLENGES WE FACE IN ARMY MODERNIZATION

RECENTLY, I PREPARED AN ILS STATE OF THE UNION MESSAGE...
TO REVIEW THE STATUS OF THE ILS MANAGEMENT PROCESS TODAY, AND OUTLINE THE COURSE WE MSUT FOLLOW TO EFFECT NECESSARY IMPROVEMENTS... A COPY OF THIS MESSAGE IS IN YOUR SYMPOSIUM PACKETS. I INVITE YOUR VIEWS AND COMMENTS

ORGANIZATIONS FOR ILS MANAGEMENT HAVE BEEN REVISED WHERE NECESSARY FOR A STRONGER STRUCTURE. FOR EXAMPLE...

- ODCSLOG DEPARTMENT OF THE ARMY LOGISTICS STAFF OFFICER (DALSO) DARCOM STAFF REORGANIZATION MATRIX MANAGEMENT FOR GREATER CONCENTRATION ON ILS MANAGEMENT FOR ACQUISITION PROGRAMS
- STANDARD DARCOM ILS OFFICES AND ILS MANAGER MISSIONS.

AND WHAT IS THE ARMY DOING?

DEPARTMENT OF ARMY POLICIES PROMULGATED THROUGH HANDBOOKS AND GUIDES... SOME JOINTLY DEVELOPED BY DARCOM AND TRAINING AND DOCTRINE COMMAND ON...

- CONTRACTING WITH THE USE OF LOGISTICAL SUPPORT ANALYSIS
- ILS RESPONSIBILITIES AND ROLES OF THE MATERIAL AND COMBAT DEVELOPERS

WE'VE STRENGTHENED OUR ILS REVIEWS AND ASSESMENTS...

- THE TRAINING AND DOCTRINE COMMAND ILS REVIEWS WITH SYSTEM MANAGER INVOLVEMENT
- DEPARTMENT OF ARMY ILS REVIEWS WITH ARMY STAFF PARTICIPATION. PRIOR TO MAJOR DECISION REVIEWS

BEGUN TO ASSESS ILS IN THE CONTEXT OF PROGRAM AND BUDGET DOCUMENTATION..

- I CAN TELL YOU IS PREVIOUS SPEAKERS HAVE NOT, THAT ILS AND FUNDING WILL RECEIVE CONSIDERABLE ATTENTION FROM THE ARMY AND DEFENSE DEPARTMENT SECRETARIAT LEVELS.

NOW, WHAT ELSE MUST BE DONE?

MUST QUICKLY GET A BETTER HANDLE ON TOTAL SYSTEM FIELDING

- DARCOM WILL SOON TEST PROCEDURES TO IDENTIFY THE TOTAL LOGISTICAL SUPPORT PACKAGE AND FUNDING TO FIELD A WEAPON SYSTEM
- THE PROCEDURES FOR ACCOUNTABILITY AND CONTROL, PACKAGING, STAGING AND FIELDING WILL BE COMPLETED BY MID-DECEMBER

CONCEPT WILL BE TESTED DURING THIS FISCAL YEAR ON MAJOR SYSTEMS TO BE FIELDED TO ...5 MAJOR ACTIVE ARMY COMMANDS, THE RESERVES, AND NATIONAL GUARD

- UH-60 BLACKHAWK HELICOPTER TO WESTERN COMMAND IN HAWAII
- MULTIPLE LAUNCH ROCKET SYSTEM TO EUROPE

EXPANDING FROM TOTAL SYSTEM FIELDING

- FOCUS ON CURRENT YEAR, BUDGET YEAR AND FIRST YEAR OF THE PROGRAM OBJECTIVE MEMORANDUM
- EXPECTED RESULTS:
  - GREATER CROSS-FUNCTIONAL INTEGRATION OF EFFORT
  - SHIFT OF FOCUS FROM MATERIEL ORIENTATION TO UNIT ORIENTATION.
  - IDENTIFICATION OF SPECIFIC AND SYSTEMIC ISSUES.

ANOTHER NEW MANAGEMENT TOOL IS THE EQUIPMENT FIELDING ASSESSMENT OFFICE (BATTLESTAFF)

FOCUS ON TOTAL SYSTEM FIELDING (MAJOR ITEMS, SUPPORT ITEMS, LOGISTICS RESOURCES)

SUSTAINED AMRY-WIDE COMMITMENT.

DA LEVEL MONITORSHIP AND EXECUTION CONTROL USING ARMY OPERATIONS CENTER CAPABILITIES AND RESOURCES FROM STAFF AGENCIES.

ALSO, EDUCATING THE DECISION MAKERS AT THE ARMY LEVEL ON THE IMPORTANCE OF ILS:

ILS - STATE OF THE UNION
"HOW THE ARMY RUNS COURSE"
DEPARTMENT OF ARMY LOGISTICS STAFF OFFICER COURSE ILS IS NOW INCLUDED IN THE CURRICULM OF ARMY'S INTERMEDIATE AND SENIOR SERVICE SCHOOLS.

RELATIONSHIP WITH INDUSTRY MUST BE ONE OF TEAMWORK AND COOPERATION..

SO THAT WHEN CONTRACTORS ARE IN TROUBLE THEY WILL LET US KNOW -

THEN WE CAN MAKE APPROPRIATE ADJUSTMENTS TO THE OVERALL ACQUISITION STRATEGY.

THIS, IN THE LONG RUN, WILL PROVE BENEFICIAL TO THE ARMY, TO THE TAXPAYER AND OUR CONTRACTORS...

GOOD INFORMATION WILL ENABLE US TO DEVELOP ALTERNATIVE STRATEGIES TO TURNAROUND PROGRAMS IN TROUBLE THUS MINIMIZE CRITICISM.

NEED TO INCENTIVIZE CONTRACTORS.. TO LET THEM FEEL THEY TOO ARE MISSION ORIENTED...

IF COMPONENTS, PROCEDURES OR DESIGNS FOR ONE SYSTEM APPLY EQUALLY TO ANOTHER SYSTEM...

THEN SOME SAVINGS SHOULD BE PASSED TO THE CONTRACTOR.

CONTRACTORS NEED TO UNDERSTAND THE SOLDIER OF TODAY.

WE ARE RECRUITING SOLDIERS THAT ARE MUCH DIFFERENT FROM THOSE RECRUITED 3,4, OR 5 YEARS AGO.

NINETY (90%) OF TODAYS RECRUITS ARE HIGH SCHOOL GRADUATES. THEY'RE SMART AND HAVE GROWN UP IN COMPUTER AGE.

DESIGN SYSTEMS FOR THE AUDIENCE THAT WILL BE USING THE SYSTEMS.

IN SUMMARY, AS WE MODERNIZE, WE MUST BE BOLD AND IMAGINATIVE IN DEVELOPING METHODS TO SATISFY LOGISTICAL SUPPORT PARAMETERS AND REQUIREMENTS..

OUR NEW ARMY ACQUISITION AND ILS SUPPORT POLICIES ENCOURAGE THE EXPLOITATION OF INDUSTRY'S TECHNOLOGY AND TECHNICAL SUPPORT BASE...

TO ACHIEVE GREATEST SYSTEM RELIABILITY, MAINTAINABILITY AND OPERABILITY, AT LOWEST LIFE CYCLE COST TO THE GOVERNMENT.

I ASSURE YOU THAT AS THE DCSLOG OF THE ARMY, I WILL CONTINUE TO PROVIDE MY SUPPORT FOR SERVICE AND INDUSTRY EFFORTS TOWARDS ACHIEVING THESE OBJECTIVES.

WE ARE MOVING FORWARD, BUT AREN'T THERE YET.

THANK YOU FOR INVITING ME.

Session III

RESEARCH AND DEVELOPMENT PROGRAM FOR WEAPON SUPPORT AND LOGISTICS

CURRENT SITUATION

- LARGE WEAPON SUPPORT TAILS ARE A DETRIMENT TO SURVIVABILITY AND RAPID RESPONSE
- PERSISTANT WEAPON SUPPORT PROBLEMS RELATED TO DESIGN AND IMPLEMENTATION
  - R&M
  - DIAGNOSTICS
  - TRAINING
  - SUPPORT SYSTEMS
- CONCURRENCY FURTHER SHORTENS THE TIME FOR SUPPORT SYSTEM AND DESIGN
- LOGISTICS ESTABLISHMENT IS FALLING BEHIND INDUSTRY AND COMMERCIAL PRACTICES
- NEED TO FIND WAY TO LIVE WITHIN LIKELY OUTYEAR SUPPORT BUDGETS AND MEET HIGH READINESS LEVELS

STRATEGY FOR WEAPON SUPPORT IMPROVEMENT

I. IMPROVE THE SUPPORT DEVELOPMENT WITHIN THE WEAPON PROGRAM
- DEMAND IMPROVEMENT AND INCENTIVIZE
- FOCUS SUPPORT DEVELOPMENT MANAGEMENT
- FRONT END FUNDING
- HAVE AVAILABLE PROVEN TECHNOLOGY

II. INCREASE PRIORITY OF WEAPON SUPPORT AND LOGISTICS IR&D
- DELAUER MEMO MARCH 82
- IR&D REVIEW PROCESS REWARD SUPPORT EFFORTS
- PROVIDE INCENTIVES FOR INDUSTRY THROUGH FUNDED R&D PROGRAM AND COMPETITION

➤ III. FUNDED R&D PROGRAM TO DEVELOP AND DEMONSTRATE WEAPON SUPPORT AND LOGISTICS TECHNOLOGY
- MAJOR IMPROVEMENT DEMONSTRATION OBJECTIVES
- ESTABLISH PE'S AND LEAD AGENCIES
- SELECTIVELY INCREASE FUNDS ON "PERFORMANCE" PE'S TO INCLUDE R&M ADVANCES

IV. LOGISTIC PRODUCTIVITY INITIATIVES FOR SUPPORT SYSTEMS OUTSIDE THE WEAPONS SYSTEMS

SCOPE OF R&D PROGRAM FOR WEAPON SUPPORT AND LOGISTICS

WEAPON SUPPORT *
- TECHNOLOGY FOR WEAPON SYSTEM
- R&M AND GENERIC TEST EQUIPMENT TRAINING EQUIPMENT
- MAINTENANCE AIDS AND NEW MAINTENANCE APPROACHES

LOGISTICS (OPERATIONS AND MANAGEMENT)
- LOGISTICS COMMUNICATION SYSTEMS
- ROBOTIC MANUFACTURING AND SUPPLY
- TRANSPORTATION AND DISTRIBUTION SYSTEMS
- COMBAT REFUELING AND REARMING SYSTEMS
- MATERIALS HANDLING SYSTEMS
- LOGISTIC MANAGEMENT SYSTEMS
- MODELING AND ANALYSIS

* EXCLUDES WEAPON SYSTEM SPECIFIC DEVELOPMENTS

"TRANSPORTATION REQUIREMENTS FOR F-15 24 AIRCRAFT SQUADRON"

ENROUTE SUPPORT TEAM A			
AGE	15 [illegible] lbs	7 8 S T	38 C141B Equiv
MISC	12 [illegible] lbs	6 0 S T	3 C141B Equiv
CONTAINS 1 ENGINE			
ENROUTE SUPPORT TEAM B			
AGE	15 726 lbs	7 8 S T	38 C141B Equiv
MISC	12 024 lbs	6 0 S T	1 C141B Equiv
CONTAINS 1 ENGINE			
INITIAL SUPPORT ELEMENT			
AGE	75 470 lbs	37 7 S T	1 8 C141B Equiv
MISC	29 420 lbs	14 7 S T	7 C141B Equiv
CONTAINS 1 ENGINE			
TACTICAL SUPPORT ELEMENT 1			
AGE	80 120 lbs	40 5 S T	2 2 C141B Equiv
MISC	75 733 lbs	37 8 S T	1 9 C141B Equiv
CONTAINS 6 ENGINES			
TACTICAL SUPPORT ELEMENT 2			
AGE	69 900 lbs	34 9 S T	1 7 C141B Equiv
MISC	47 000 lbs	23 5 S T	1 2 C141B Equiv
AIS	166 703 lbs	83 3 S T	4 1 C141B Equiv
INTERMEDIATE LEVEL			
	86 400 lbs	43 2 S T	2 1 C141B Equiv
TOTALS	**694,981 lbs**	**347 4 S/T**	**17 3 C141B Equiv**

SUMMARY
R&D PROGRAM FOR WEAPON SUPPORT AND LOGISTICS

- **HIGH LEVERAGE APPROACHES RECOGNIZED**
  - **WIDEN TECHNOLOGY BASE ACTIVITIES**
  - **ESTABLISH LARGE SCALE DEMONSTRATIONS**
  - **INCREASE INDUSTRY INVOLVEMENT**
- **CLIMATE IS RIGHT**
  - **READINESS HIGHEST DOD PRIORITY**
  - **MANAGEMENT SUPPORT AND FUNDING BEING PROVIDED**

PROPOSED INITIAL DEMONSTRATIONS

OBJECTIVE	SUMMARY OF FY84 R&D INITIATIVE	PAYOFF
ELIMINATE OR REDUCE INTERMEDIATE MAINTENANCE	AIR FORCE DEVELOP PROTOTYPE SUBSYSTEMS TO DEMONSTRATE SIGNIFICANT R&M IMPROVEMENTS	DEPLOYMENT AND SUSTAINED BARE BASE OPERATIONS (30 90 DAYS)
SURVIVABLE UNIT LEVEL LOGISTIC C³	SYSTEM ARCHITECTURE STUDIES	SUSTAINABILITY REDUCTION OF SUPPORT RESOURCES
AUTOMATED BATTLEFIELD MATERIEL HANDLING	ARMY DESIGNS FOR AMMUNITION HANDLING SYSTEMS	FIREPOWER SURVIVAL
AUTOMATED LOW VOLUME SPARES PARTS PRODUCTION	FEASIBILITY STUDIES	READINESS COST REDUCTION
TRANSITION FROM 'PAPER' TO DIGITAL SYSTEM	ARMY NAVY AND AIR FORCE PROJECTS ON LOGISTICS DATA GENERATION DISSEMINATION CAD CAM AUGMENTATION FOR R&M PRINT ON DEMAND SYSTEM DEMONSTRATION	RESPONSE ERROR REDUCTION MANPOWER SAVINGS

OUTLINE

- WHAT'S COMING
- THE IMPORTANCE OF LOG R&D
- EXAMPLES OF LOGISTICS CONCERNS
- SOME PROMISING POSSIBILITIES
- HOW IT'S DONE
- PRESENT PROGRAM
- FUTURE EFFORT

P098bw.

THE IMPORTANCE OF LOG R&D

- TRADOC IDENTIFIED 87 LOGISTICS R&D DEFICIENCIES IN THE MAA
- TRADOC'S CONCLUSION: "BATTLE CANNOT BE SUPPORTED... IMPROVE (CSS). ALTERNATIVE IS BATTLE FAILURE."
- LOGISTICS SYSTEMS ARE A GENERATION BEHIND THE EQUIPMENT THEY SUPPORT.
  - MUCH LOGISTICS SUPPORT EQUIPMENT AND MOST MHE IS ESSENTIALLY WWII VINTAGE.
  - LESS THAN 2% OF RDTE IS DEVOTED TO LOGISTICS SYSTEMS IMPROVEMENT.

LOGISTICS CONCERNS

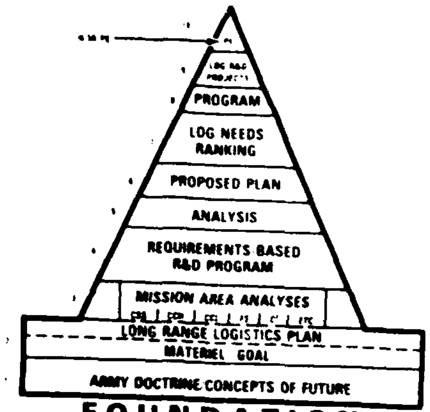
- DISTRIBUTION OF POL
- DISTRIBUTION OF AMMUNITION
  - *PACKAGING TO REDUCE WEIGHT AND VOLUME*
  - ALTERNATIVES TO REDUCE QUANTITIES
  - TRANSPORTATION *VICE FORWARD* STOCKS
- REARM AND REFUEL
- ROBOTICS IN THE FIELD AND WAREHOUSING
- AIR TRANSPORTABILITY
- RECONSTITUTION OF FORCES

P098bw.09

WHAT'S COMING

- 400+ SYSTEMS COMING ON LINE THIS DECADE
- FEWER CSS SOLDIERS (DECREASING 18-28 AGE GROUP-PRIORITY WILL BE TO COMBAT ELEMENTS)
  - LESS THAN 14% OF LOGISTICS UNITS ARE AC:36% RC, 25% HNS, 25% UNMANNED.
  - 73% OF MAINTENANCE, 75% OF AMMO UNITS, ARE RC.
- INCREASINGLY EXPENSIVE AND COMPLEX EQUIPMENT THAT MUST BE: LIGHTER, LESS BULKY, MORE EASILY SUPPORTABLE
- LOGISTICS SYSTEMS MUST DO MORE WITH LESS
- U.S. TAKING ON LARGER GLOBAL ROLE REQUIRING: FASTER RESPONSE, DIVERSE AREAS, SHORTER TAIL

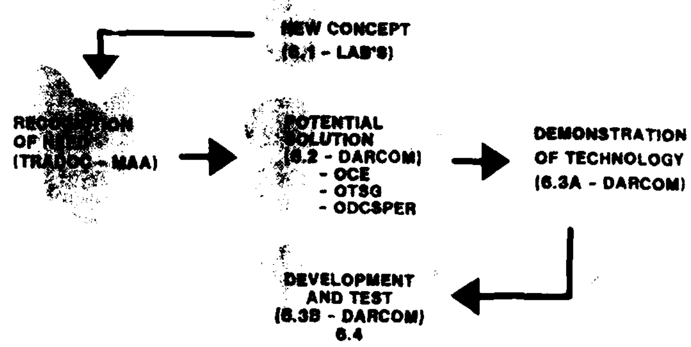
LOGISTICS RESEARCH & DEVELOPMENT MECHANISM



– FOUNDATION –

P098bw

... IT'S DONE



... OULD ...G"

13 MISSION AREA ANALYSIS	87 LOGISTICS R&D RELATED DEFICIENCIES
MISSION AREAS	**LOG DEFICIENCIES**
COMBAT SERVICE SUPPORT	- 27
CLOSE COMBAT - HEAVY	- 5
CLOSE COMBAT - LIGHT	- 5
AIR DEFENSE ARTILLERY	- 5
AVIATION	- 5
BATTLEFIELD NUCLEAR WEAPONS	- 5
CHEMICAL	- 5
COMMAND AND CONTROL	- 5
COMMUNICATION	- 5
ENGINEER/MINE WARFARE	- 5
FIRE SUPPORT	- 5
INTELLIGENCE & ELECTRONIC WARFARE	- 5
SPECIAL OPERATIONS	- 5

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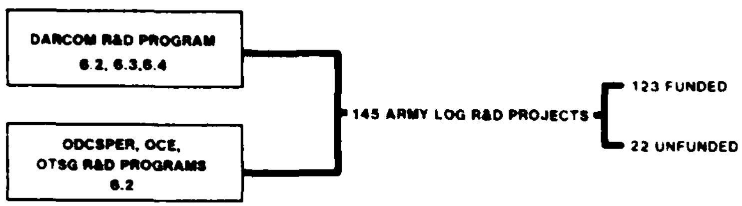
SOME PROMISING POSSIBILITIES

- ADAPT CIVIL DISTRIBUTION SYSTEMS
  - HANDLING
  - MARKING
  - INVENTORY
  - TRACKING
  - AUTOMATION
  - COMMUNICATION
  - TRANSPORTATION
- USE EXISTING TECHNOLOGIES TO DO BETTER

P098bw.04

METHODOLOGY-
CURRENT EFFORT
"WHERE WE ARE GOING"



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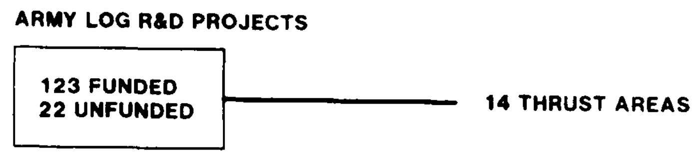
METHODOLOGY-
MATCH TO THRUSTS

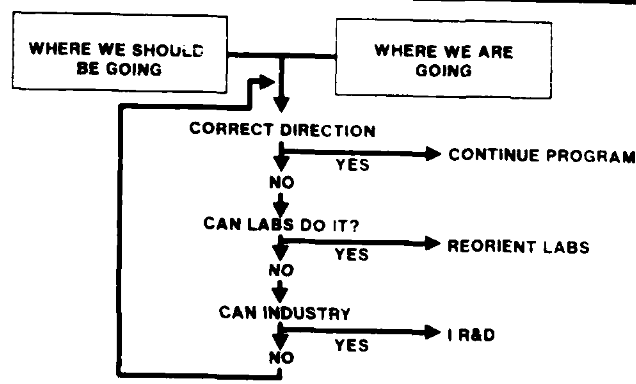


RY ANALYSIS

ALL PROGRAMS	TECH THRUST	# PROJECTS	FY 84 $M (FUNDED)
6.2	RELIABILITY	11	3.1
6.3A	MAINTAIABILITY	4	2.1
6.3B	DIAGNOSTICS TECH	11	2.3
6.4	AUTO TEST EQUIP	11	5.4
	LOG TRAINING?SIMULATORS	2	0.5
	TECH DATA MGT	10	~~6.6~~ 3.1
	MAINT/OVERHAUL AIDS	10	1.5
	METROLOGLY	2	0
	WEAPON SUPPORT MANAGEMENT	0	0
	AUTOMATED SPACE PARTS M	0	0
	MATERIEL TRANS, HNDLNG, DIST	40	7.1
	FUELS/MUNIT TECH	4	1.5
	LOGISTICS FACILITIES	3	1.0
	LOG COMMO, INFO, MGT SYST	5	2.8
	OTHER	36	11.7
		145	42.54

p098bw.12

METHODOLGY
FUTURE EFFORT
(POM 86)



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LONG RANGE LOG PLAN (LOG 2004)

SECURITY ASSISTANCE

STRATEGIC MOBILITY

LOGISTICS OVER THE SHORE

MUNITIONS SUPPLY

WATER SUPPLY

CSS WITH THE COMBAT FORCE

MAINTAINABILITY

REPAIR/ RECOVERY/ EVACUATION

LOG R&D

MAINTENANCE AIDS

SUPPORTABILITY

LOGISTICS COMMUNICATIONS

LOGISTICS ADP

RECONSTITUTION

SUPPLY CONCEPTS

ALTERNATIVE ENERGY SOURCES

SUSTAINABILITY

[illegible]

[illegible] TODAY ARE [illegible] THE NAVY [illegible]
RECENTLY EXPANDED WEAPON [illegible]
EFFORT. THE NAVY [illegible]
PROGRAM TO MEET BOTH [illegible] AND NAVY [illegible]
SUCCESS IS DEPENDENT UPON A [illegible]
BETWEEN NAVY AND THE OTHER SERVICES [illegible]
PLAY A DECISIVE ROLE IN THIS NEW [illegible]
ASSURE SUCCESS, WE MUST INCREASE [illegible] COMMUNICATION [illegible]
PAST YEAR, WE HAVE MADE AN EFFORT [illegible]
INDUSTRY THROUGH ON-SITE R&D [illegible] AND [illegible]
TODAY'S BRIEFING IS A CONTINUATION [illegible] COMMUNICATION [illegible]
NAVY'S LOGISTICS R&D [illegible]

IN [illegible] NAVAL MATERIAL [illegible]

[illegible]

[illegible] WHAT [illegible]
WEAPONS SYSTEMS SUPPORT, IMPROVE READINESS, AND REDUCE MAINTENANCE.
IN OTHER WORDS, [illegible] THE [illegible] THROUGH THE APPLICATION OF
NEW AND EMERGING TECHNOLOGY.

SLIDE 3

A DOD LOGISTICS R&D WORKING [illegible] TIVES OF THE THREE SERVICES AND [illegible] SHOWN HERE AS A FRAMEWORK [illegible] LOGISTICS R&D PROGRAM PLAN [illegible] PROPOSED R&D ACTIVITIES WHICH [illegible] TO BE CONSIDERED IN VIEW OF THE [illegible] AREA.

[illegible]

SLIDE 4

AS MR. METH EXPLAINED EARLIER, WITHIN THE FRAMEWORK [illegible] TECHNOLOGY AREAS SET FORTH FOR THE PROGRAM, FIVE LOGISTICS [illegible] STRATION OBJECTIVES HAVE BEEN IDENTIFIED FOR NEAR TERM INVESTMENT [illegible] ALL THREE SERVICES. THESE INVESTMENTS ARE BEING MADE IN AREAS WHERE PRODUCIBLE RESULTS CAN QUICKLY BE TRANSITIONED TO OPERATIONAL [illegible] AND BRING ABOUT SUBSTANTIAL IMPROVEMENT IN LOGISTICS SUPPORT SYSTEMS. NAVY FY '84 AND '85 DEMONSTRATION PROJECTS HAVE BEEN SELECTED CONSISTENT WITH THESE TARGETED OBJECTIVES. AS OUR PROGRAM IS MORE [illegible] DEFINED, OTHER OBJECTIVES WILL BE ADDED.

THE NAVY HAS BEEN DESIGNATED LEAD SERVICE FOR COORDINATION [illegible] PROGRAMS IN THE LAST TWO OBJECTIVE AREAS.

[illegible]

THAT THE [illegible] JOINT SERVICES [illegible] PROCESS OF BEING CHARTERED AS THE [illegible] LOGISTICS R&D [illegible] ESTABLISHING ANOTHER JOINT TECHNICAL [illegible] MANUFACTURING OF SPARE PARTS ON DEMAND.

[illegible]

AGENT [illegible] THE NAVY [illegible]
[illegible] EFFORT.

[illegible] WE ARE PLANNING [illegible]
[illegible] APPLICATION [illegible]
INFORMATION [illegible] AND [illegible]
PART [illegible] DEMAND [illegible]

[illegible] AT PART [illegible]
RESULT OF A SURVEY [illegible] NAVY [illegible]
GENERAL LOGISTICS R&D.

THE REVIEW [illegible] PROGRAMS [illegible]
THAT MEET [illegible] NAVY [illegible]
WE HOPE [illegible]
PRIORITY AND THE [illegible]
DEVELOPMENT [illegible]
RECOMMEND A PROGRAM [illegible]
FLEET [illegible] NAVY.

[illegible]

[illegible]

THIRD, WHILE WE ARE [illegible]
LOOKING AT NEW START [illegible] PROGRAMS [illegible]
PROGRAMS AND BY CAREFULLY [illegible] NEW START [illegible] WE [illegible]
"BEST MIX" OF PROJECTS [illegible] REQUIREMENTS [illegible]
PREPARED A DRAFT [illegible]
RECENTLY, A GROUP OF NSIA REPRESENTATIVES [illegible]
LOGISTICS R&D PROGRAM AND [illegible]
ON THEIR KNOWLEDGE OF EMERGING [illegible]
WERE VERY POSITIVE. WE INTEND [illegible]
INDUSTRY THROUGH MEETINGS [illegible] AND OTHER NAVY [illegible]
FORUMS.

[illegible]

A[illegible] THE MAINTENANCE [illegible]
[illegible] DEVELOP [illegible] EQUIPMENT [illegible]
[illegible] INTRODUCED BY NEW SYSTEMS [illegible]
[illegible] ATION [illegible]
PROVIDE [illegible] NEW SYSTEM.

ANOTHER MAINTENANCE PROBLEM AREA [illegible]
[illegible] ABILITY IN NEW AND [illegible] SYSTEMS [illegible]
[illegible]
INTELLIGENCE AND [illegible]
[illegible] ING.

FINALLY, WE HAVE [illegible]
TECHNIQUES FOR [illegible] APPLICATION [illegible] AND [illegible]
REPAIR AIRCRAFT BATTLE DAMAGE AT THE [illegible] AND INTERMEDIATE
LEVELS.

[illegible] NEW TA[illegible] THAN [illegible]
[illegible] INFORMATION [illegible] INFORMATION [illegible]

HAS MAJOR [illegible]

[illegible]

AND [illegible] IMPORTANT [illegible]

APPROACH [illegible] THE TRAN[illegible]

THE NAVY WILL BE ABLE [illegible]

[illegible]

[illegible]

WE HAVE PROPOSED [illegible]

[illegible] INFORMATION [illegible]

[illegible] BARCODE [illegible] MANAGEMENT [illegible]

A PROJECT TO IMPROVE [illegible]

AUTOMATION OF TECHNICAL INFORMATION [illegible]

THE [illegible] OF TECHNICAL DATA [illegible]

[illegible]

TIMELY DATA [illegible]

THE SUPPLY OF PARTS.

FINALLY, WE HAVE [illegible] PARTS-ON-DEMAND AND [illegible]

NAVY [illegible]

NAVY [illegible]

WE HAVE [illegible]

NAVY [illegible]

AND NAVY [illegible]

[illegible]

[illegible] AT [illegible] NAVY [illegible]

I AM [illegible]

[illegible]

[illegible]

INITIATIVE [illegible]

[illegible]

I THINK THAT [illegible]

[illegible]

PRIVATE.

SLIDE [illegible] CONT'D

WHICH ARE CAPABLE OF PRODUCING [illegible] ON DEMAND A CONSTANTLY CHANGING MIX [illegible] REQUIRED REPAIR PARTS FOR NAVY SYSTEMS USING ADVANCED [illegible] LOW VOLUME, AUTOMATED MANUFACTURING TECHNOLOGY. THIS EFFORT WILL [illegible] LOW VOLUME OR INSURANCE TYPE SPARE REPLACEMENT PART REQUIREMENT [illegible] MECHANICAL, ELECTRICAL AND ELECTRONIC PARTS INCLUDING A [illegible] INTEGRATED CIRCUIT REPLACEMENT PROGRAM TO REDUCE THE IMPACT THAT [illegible] AND DIMINISHED SOURCES OF SUPPLY ARE HAVING ON THE NAVY [illegible] POSTURE. THIS IS AN AREA WITH [illegible] POTENTIAL [illegible] IN THE NEAR TERM.

FULLY OPERATIONAL PARTS-ON-DEMAND [illegible] AN REDUCE REPAIR PART [illegible] TIMES BY ABOUT 1/3, REDUCE INVENTORY COSTS BY 10% AND [illegible] ANNUAL PROCUREMENT EXPENDITURES BY [illegible]. INITIAL DEMONSTRATION AT THE NATIONAL BUREAU OF STANDARDS HAVE SHOWN A [illegible] REDUCTION IN PRODUCTION TIMES.

ALL THESE PROJECTS ARE PROPOSED FOR START-UP IN THE [illegible] TIME FRAME.

[illegible]

IN SUMMARY, THE NAVY [illegible]

[illegible] THE [illegible]

COORDINATED [illegible]

THE NAVY [illegible] PROGRAM [illegible]

1. TO IMPROVE THE READINESS AN[illegible] SUSTAINAB[illegible]

AND [illegible]

TECHNICAL AND [illegible]

2. [illegible]

OBTAIN GREATER RETURN ON INVESTMENT.

TO ACCOMPLISH THESE AIMS, THE NAVY AND [illegible] TOGETHER [illegible] IN NEAR-TERM [illegible] ACCELERATING [illegible] IN OUR RESEARCH [illegible] UNSOLICITED PROPOSAL [illegible] NAVY [illegible] COOPERATIVE R&D AGREEMENTS.

WE HAVE STARTED A COORDINATED [illegible] PROGRAM [illegible] ARE PREPARING A RECOMMENDED [illegible] PROGRAM [illegible]

I WILL NOW RESPOND TO ANY [illegible] YOU MAY HAVE.

THE NAVY LOGISTICS RESEARCH & DEVELOPMENT PROGRAM

NAVY LOGISTICS R&D PROGRAM

- CHARTERED 1982
- NAVSUP DESIGNATED "LEAD SYSCOM"
- OBJECTIVES

LOGISTICS R&D TECHNOLOGY AREAS

- RELIABILITY TECHNOLOGY
- MAINTAINABILITY TECHNOLOGY
- DIAGNOSTICS TECHNOLOGY
- AUTOMATIC TEST EQUIPMENT
- LOGISTICS TRAINING AND SIMULATOR SYSTEMS
- TECH DATA MANAGEMENT
- MAINTENANCE AND OVERHAUL AIDS
- METROLOGY FOR FIELDED WEAPON SYSTEMS
- WEAPON SUPPORT MANAGEMENT, REPORTING, AND ANALYSIS SYSTEMS
- AUTOMATED SPARE PARTS MANUFACTURING/REPAIR
- MATERIEL TRANSPORTATION, HANDLING, AND DISTRIBUTION SYSTEMS
- FUELS AND MUNITIONS TECHNOLOGY
- LOGISTICS FACILITIES
- LOGISTICS COMMUNICATION, INFORMATION AND MANAGEMENT SYSTEMS

NEAR TERM LOGISTICS R&D OBJECTIVES

- ELIMINATE OR REDUCE INTERMEDIATE LEVEL MAINTENANCE
- PROVIDE SURVIVABLE LOG. C^2 TO UNIT LEVEL
- IMPROVE BATTLEFIELD MATERIAL HANDLING
- AUTOMATE LOW VOLUME SPARES PRODUCTION
- ACCELERATE TRANSITION FROM "PAPER" TO DIGITAL INFORMATION SYSTEMS

NAVY LOGISTICS R&D PROGRAM

CURRENT ENVIRONMENT:

- INCREASED OSD EMPHASIS
  - $60 MILLION FUNDING WEDGE FY 84
  - WEAPON SUPPORT AND LOGISTICS R&D POLICY COUNCIL
- JLC INITIATIVE
  - JOINT POLICY COORDINATING GROUP
  - COORDINATED SERVICE PLANS

NAVY LOGISTICS R&D PROGRAM

CURRENT PROGRAM

- TIME PHASED DEMONSTRATIONS - FY 84 AND FY 85
- COMPREHENSIVE IMPLEMENTATION PLAN
- POM 86 SUBMISSION

NAVY LOGISTICS R&D PROGRAM

POM 86 SUBMISSION:

- DEVELOPED AROUND 3 OBJECTIVES
  - ENHANCE MAINTENANCE OPERATIONS AT ALL ECHELONS
  - ACCELERATE TRANSITION OF LOG DATA FROM PAPER TO DIGITAL INFO SYSTEMS
  - INCREASE AVAILABILITY OF REPLENISHMENT PARTS USING PARTS-ON-DEMAND MANUFACTURING TECHNOLOGIES
- PROJECT SELECTION CRITERIA
  - NEAR TERM RESULTS
  - COST AVOIDANCE POTENTIAL
  - HIGH TECHNOLOGY DEMONSTRATIONS

NAVY IR&D PROGRAM

- LOGISTICS R&D FOCAL POINT
- INITIATIVES
  - CADRE OF LOGISTICIANS
  - ON-SITE REVIEWS
  - WORK SHOPS

SUMMARY

- NAVY LOGISTICS R&D PROGRAM
  - OSD INTEREST
  - JLC INITIATIVE
  - TWO MAJOR OBJECTIVES
- NAVY-INDUSTRY INTERACTION
- PREPARING POM 86 SUBMISSION

[illegible]

THANK YOU [illegible] LADIES, AND GENTLEMEN. IN THIS DAY AND AGE, WE LIVE IN A WORLD [illegible]

[illegible]

[illegible] DEVELOP A [illegible] STRUCTURE AROUND THESE THREE ELEMENTS. [illegible]

[illegible]

[illegible]

SLIDE 5

MANY OF YOU HAVE SEEN THIS SLIDE BEFORE. IT'S PROOF IS IN THE INACTIVITY IN HOSPITAL DELIVERY ROOMS EIGHT YEARS AGO.

SLIDE 6

THIS INDUSTRY PROJECTION OF DOD EXPENDITURES FOR SOFTWARE IS ALSO OF GREAT CONCERN TO US. THESE ARE NOT CUMULATIVE FIGURES. THESE ARE PROJECTED 1990 EXPENDITURES. THE OBVIOUS POINT HERE IS YOU CAN'T FLATTEN THE CURVE BY [illegible] A MAJOR PROGRAM. IT IS ALL AROUND US IN TERMS OF AN EXPONENTIAL EXPLOSION IN TELECOMMUNICATIONS AND CHIP TECHNOLOGY.

SLIDE 7

MANY OF YOU HAVE SEEN THIS CHART ALSO, BUT LET ME TRY AND PUT IT IN PERSPECTIVE.

SLIDE 7 OVERLAY

THE CANCEROUS GROWTH IN [illegible] COSTS HAS PUT US IN THE SAME POSITION PRESIDENT REAGAN ENCOUNTERED IN TRYING TO CUT FEDERAL SPENDING AND RUNNING INTO THE FACT THAT 70% OF TOTAL FEDERAL OUTLAYS WERE UNTOUCHABLE IN THE AREAS YOU SEE LISTED (POINT OUT), AND THE ONLY SOFT ONE OF THE FOUR IS DEFENSE. MR. GEORGE WILL, IN A DEFENSE WEEK SYMPOSIUM LAST FALL, PREDICTED THAT BY 1985, 90.5% OF TOTAL FEDERAL OUTLAYS WILL FALL INTO THESE CATEGORIES. THE OBVIOUS POINT WAS NO ONE CHALLENGED HIM.

SLIDE 7A

I WOULD LIKE TO SHIFT NOW TO SOME OF THE FUTURE IMPLICATIONS WE FACE. THE AIR FORCE PLANNER IS REALLY UP AGAINST THE WALL FOR THESE REASONS, YET AT 2000

THESE [illegible] IN THE MARKET PLACE. IT WILL TAKE MORE OF OUR BUDGET TO HIRE, TRAIN, AND RETAIN PEOPLE UNLESS WE DRAMATICALLY REDUCE OUR NEEDS THROUGH SMART APPLICATION OF TECHNOLOGY.

[illegible] SOME POSITIVE [illegible] THE AIR FORCE [illegible] MEETING THIS CHALLENGE, AND START WITH THE LOG R&D PROCESS.

SLIDE 9

THE WHOLE PROCESS FUNCTIONS UNDER THE UMBRELLA OF STATED LOGISTICS LONG RANGE OBJECTIVES. I WILL TALK MORE ABOUT THESE OBJECTIVES LATER. HERE YOU SEE THE [illegible] NEEDS FROM THE [illegible] THROUGH OUR OFFICE, [illegible] AND [illegible] COMMAND IN THE FORM OF STATED REQUIREMENTS. WHILE THE FORMAL PROCESS [illegible], THERE IS CONTINUOUS INFORMAL CONTACT BETWEEN THE [illegible] AND THE LABS THAT HELPS TO SHAPE AND REFINE EACH LOGISTICS NEED. THE [illegible] WHAT WE HAVE [illegible] STRUCTURED PROGRAM THAT STARTED IN [illegible] COMMAND IN 19[illegible] AND ELEVATED THAT PROGRAM TO AN AIR FORCE [illegible] PROGRAM.

SLIDE 10

LET ME DISPLAY THIS PROCESS FROM ANOTHER PERSPECTIVE. HERE YOU SEE THE LOG NEED ENTERING THE RESEARCH ARENA. THE R&D OUTPUT PROVIDES US THE THRUST [illegible] [illegible] CHANGE IN THE THREE VITAL LOGISTICS ELEMENTS DISPLAYED ON THE RIGHT. HOWEVER, [illegible] INDIVIDUAL NEEDS IS NOT ENOUGH.

SLIDE 11

COMMUNICATION IS THE KEY TO SUCCESS. THIS DOCUMENT, WHICH WE AFFECTIONATELY

REFER TO AS THE LOG R&D YELLOW PAGES, INCLUDES THE ELEMENTS YOU SEE ON THE LEFT, IS DISTRIBUTED WIDELY TO THE AGENCIES REFLECTED ON THE RIGHT AND IS DESIGNED TO INFLUENCE THE PROCESSES SHOWN ON THE BOTTOM. IT IS OUR ATTEMPT TO TELL THE WORLD WHERE WE ARE GOING, WHAT IS CURRENTLY ONGOING AND PLANNED, AND PROVIDES A READY REFERENCE TO AIR FORCE LOG R&D IN ONE DOCUMENT. I BROUGHT A BOX OF THE FIRST VERSION WITH ME FOR YOU. NOW YOUR QUESTION IS, "SO WHAT?" WHAT REALLY COUNTS IS MONEY.

SLIDE 12

HERE YOU SEE THE TIP OF THE ICEBERG. THESE FUNDING PROFILES REPRESENT [illegible] FOR [illegible] NEEDS BY YEAR, WITH THE STEADY GROWTH FROM 19[illegible] WHEN AFLC STARTED THE PROGRAM. EACH PROFILE, BY YEAR, REPRESENTS THE TIME AND DOLLARS TO COMPLETE THE LOG NEEDS FOR THAT YEAR PLUS ACTIVE ONES FROM PREVIOUS YEARS. OVER 60 MILLION WILL BE SPENT BY THE AIR FORCE LABS IN 1984 ON [illegible] NEEDS ALONE, AND THAT IS JUST THE TIP OF THE ICEBERG. NOW LET'S SEE WHAT IS BELOW THE WATER LINE.

SLIDE 13

THERE ARE TWO NEW AIR FORCE PROGRAM ELEMENTS IN THE 84 BUDGET. MR. BOB BROWN FROM THE NEW AIR FORCE ACQUISITION LOGISTICS CENTER WILL TALK ABOUT A COUPLE OF SUPER CANDIDATES IN THE 6.4 PROGRAM. LET ME JUST SAY THESE ARE MULTI-MILLION DOLLAR PROGRAMS AND PROGRAMMED TO GROW IN THE OUT-YEARS. THE PROGRAMS LISTED BELOW THE 6.3/6.4 AREAS ARE EXAMPLES OF MAJOR LAB PROGRAMS THAT HAVE R&M AS INHERENT INGREDIENTS IN THEIR PROGRAM STRUCTURE. THESE PROGRAMS (POINT OUT) DID NOT STEM FROM A SPECIFIC LOGISTICS NEED. ON THE CONTRARY, THEIR ORIGINS STEM FROM OPERATIONAL NEEDS. TAKE PAVE PILLAR FOR

EXAMPLE. ONE OF ITS MAJOR DESIGN OBJECTIVES IS [illegible] ENGINEER AWAY THE NEED FOR INTERMEDIATE AVIONICS EQUIPMENT AND MAKE ON AND OFF OR TWO LEVELS OF AVIONICS MAINTENANCE A REALITY, A SHEDDING OF THE [illegible] THE AIR FORCE LABS WILL SPEND OVER [illegible] MILLION ON [illegible] PROGRAMS OVER A THREE-YEAR PERIOD. IN OTHER WORDS,

SLIDE [illegible] OVER

THESE TWO BOTTOM LINES ARE THE REAL MEASURE OF OUR SUCCESS. [illegible] CONCEPTION. TECHNOLOGY CONCEPTION TAKES PLACE IN THE LABS IN BOTH THE AIR FORCE AND CONTRACTORS' INDEPENDENT RESEARCH AND DEVELOPMENT PROGRAMS. [illegible] THE GENES, SOWN DURING CONCEPTION ARE ROBUST AND DURABLE, THEN THE TECHNOLOGICAL OFFSPRING [illegible] CARRY THOSE TRAITS. TAKE VERY HIGH SPEED INTEGRATED [illegible] [illegible] HEALTH MONITORING, RE[illegible] POWER [illegible] IN THE [illegible] RANGE AND CONNECTORS [illegible] ENVIRONMENTAL CONTAMINATION [illegible] [illegible], AND HEAT ARE THE [illegible] WE ARE TALKING ABOUT. [illegible] THE GENES ARE NOT ROBUST AND DURABLE, THEN THE TECHNOLOGICAL [illegible] CONTINUE TO DEMAND EXPENSIVE [illegible] AND [illegible] THE TRAITS [illegible] INCREASING SYSTEMS TODAY. THIS IS WHY IT IS SO IMPORTANT [illegible] WELL BEYOND THE LOGISTICS NEEDS PROGRAM AND EMBED THESE ROBUST AND DURABLE GENES IN DOD AND CONTRACTOR DEVELOPMENT PROGRAMS. THESE PROGRAMS NEED LOGISTICS AND USER SUPPORT AND ADVOCACY, AND THAT IS EXACTLY WHAT THE AIR FORCE IS DOING TODAY. NOW I [illegible] CONTRACTOR INDEPENDENT RESEARCH AND DEVELOPMENT [illegible].

SLIDE 14

MANY PEOPLE HAVE ASKED ME WHY LOGGIES ARE SO INTERESTED IN IR&D. MANY SAY

[illegible] THE ANALOGY BETWEEN RESEARCH AND [illegible] [illegible] TAKE A [illegible] AT THAT NUMBER, [illegible] DOLLARS, AND [illegible] [illegible] WE ARE INTERESTED [illegible] RECENTLY [illegible] AN [illegible] INVOLVEMENT IN [illegible] EVALUATIONS. THE [illegible] ALSO [illegible] A [illegible] IN [illegible] OF THE [illegible] AND [illegible] HAVE A MASSIVE IMPACT ON [illegible] CAPITAL INVESTMENT [illegible] IN TERMS OF [illegible] AND [illegible] THE [illegible]

[illegible]

[illegible] AND [illegible] IN [illegible] IN BOTH THE NUMBER AND QUALITY OF PROJECT EVALUATIONS IN 1984. WE ARE MOVING [illegible] PROGRAM WITH [illegible] WE [illegible] STARTED THE [illegible] PROGRAM.

[illegible]

[illegible] A KEY ELEMENT [illegible] THIS [illegible] NEW DIMENSION IN WEAPON SYSTEM [illegible]

[illegible] AND OPERATING [illegible] MR. BOB BROWN [illegible] PRESENTATION, YOU ARE IN FOR A REAL TREAT. WE ARE NOW PLANNING A [illegible]

SLIDE 17

ANOTHER COMMUNICATION VEHICLE IS OUR RECENTLY INITIATED SENIOR LEVEL VISIT PROGRAM. UPON A CONTRACTOR REQUEST, WE PROVIDE A RELEASABLE COPY OF THE OPERATIONAL SUPPORT CHAPTER OF THE AF 2000 STUDY TO THE CONTRACTOR, ALONG WITH [illegible] VIDEOTAPE. WE ASK THAT THE VISIT INVOLVE SENIOR CORPORATE RESEARCH AND DEVELOPMENT LEADERS. WE WANT TO SEE HOW THE AF 2000 MESSAGE IS BEING WOVEN INTO CORPORATE IR&D PROGRAMS. WE BRING AN AIR FORCE TEAM OF GENERAL OFFICERS AND SENIOR COLONELS/CIVILIANS ACROSS THE SPECTRUM OF THE AIR FORCE, SYSTEMS COMMAND, AND LOGISTICS COMMAND WHO CAN MAKE A DIFFERENCE. WE SPEND ONE DAY TOGETHER AND WRAP UP THE ACTIVITIES WITH AN HOUR AND A HALF WHERE FRANK AND [illegible] EXCHANGES TAKE PLACE. WE KNOW IT WILL TAKE MAJOR CHANGES ON BOTH SIDES TO MAKE A DIFFERENCE. ARE WE MAKING A DIFFERENCE?

SLIDE 18

[illegible] AS YOU READ THIS MESSAGE FROM ONE OF OUR LEADING DOD CONTRACTORS, (PAUSE) WE SEE MAJOR SHIFTS IN EMPHASIS ACROSS A WIDE SPECTRUM OF CONTRACTOR IR&D PROGRAMS TOWARDS WEAPON SYSTEM READINESS AND AVAILABILITY THROUGH [illegible] LOGISTICS R&D IN THEIR PROGRAMS. TAKE A LOOK AT THE COVER STORY IN THE [illegible] ISSUE OF BUSINESS WEEK AND SEE WHERE MR. DANFORTH IS TAKING WESTINGHOUSE. LET ME WRAP UP WITH ONE LAST SLIDE.

SLIDE 19

WE ARE NAIVE IF WE EVER THINK LOGISTICS R&D WILL TAKE THE LEAD OVER

PERFORMANCE. HOWEVER, [illegible] R&D, SHOWN HERE IN TERMS OF AVAILABILITY R&D, MUST [illegible] IN [illegible] WITH PERFORMANCE R&D. IN OTHER WORDS,

SLIDE 19 OVERLAY

THEY ARE PLANNED, [illegible], AND [illegible] TOGETHER, ALL THE TIME, NEVER [illegible] SEPARATE AGAIN. THIS IS THE OBJECTIVE OF THE AIR FORCE LOGISTICS R&D PROGRAM, AND WE ARE MOVING SWIFTLY TOWARDS THAT OBJECTIVE. YOU CAN HELP BURY THE OLD WIVES TALE THAT [illegible] R&D IS A [illegible] FOR LARGE R&D DOLLARS. BY TAKING THIS MESSAGE [illegible] EVERY [illegible] YOU CAN, YOU CAN MAKE A DIFFERENCE. I THANK YOU FOR YOUR TIME AND ATTENTION AND [illegible] QUESTIONS.

OVERVIEW

- WHAT IS LOG R&D
- WHY IS IT IMPORTANT
- THE FORMAL PROCESS
- KEY ELEMENTS
- RESULTS

DEFINITION

LOGISTICS RESEARCH IS

RESEARCH AIMED AT IMPROVEMENTS IN ANY OF THE VARIED LOGISTICS FUNCTIONAL AREAS WITH THE END RESULT OF IMPROVED SUPPORTABILITY, READINESS AND LIFE CYCLE COST. IT INCLUDES EFFORTS IN BOTH THE PHYSICAL AND MANAGEMENT SCIENCES AREAS

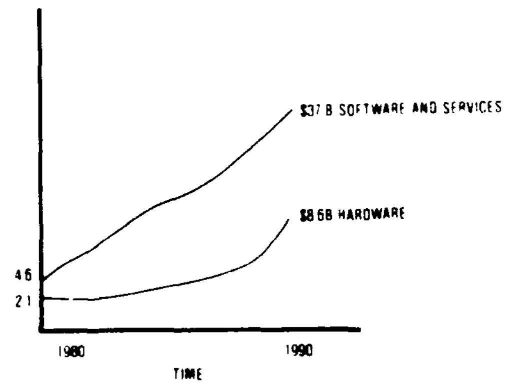
ADVANCED NIGHT VISION SYSTEMS HAVE ALREADY DENIED CONCEALMENT BY DARKNESS, AND ATTENTION IS TURNING TO PEELING AWAY THE COVER OF WEATHER AS SURELY AS ONE PEELS AWAY THE LAYERS OF AN ONION. IT THUS SEEMS LIKELY THAN SOON THE ONLY REMAINING PLACES TO HIDE WILL BE IN "DEEP" SPACE, UNDER THE WATER OR UNDER THE GROUND.

A MAJOR AIM OF THE 1980'S FOR BOTH FREE WORLD AND COMMUNIST NATIONS WILL BE TO ELIMINATE THESE LAST SANCTUARIES AND IN PARTICULAR TO MAKE THE OCEANS TRANSPARENT.

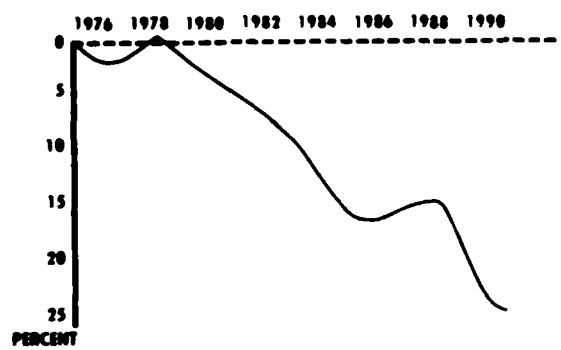
IF THE 1970'S WITNESSED THE ADVENT OF MILITARY SYSTEMS THAT WILL HIT THEIR INTENDED TARGETS AND THE 1980'S CAN BE EXPECTED TO CONSTRUCT THE GROUND WORK FOR FINDING THE TARGET, WHAT THEN REMAINS? <u>TO SURVIVE!</u>

NORMAN R. AUGUSTINE, 1982
CHAIRMAN DEFENSE SCIENCE BOARD

SOFTWARE COSTS & MAINTENANCE



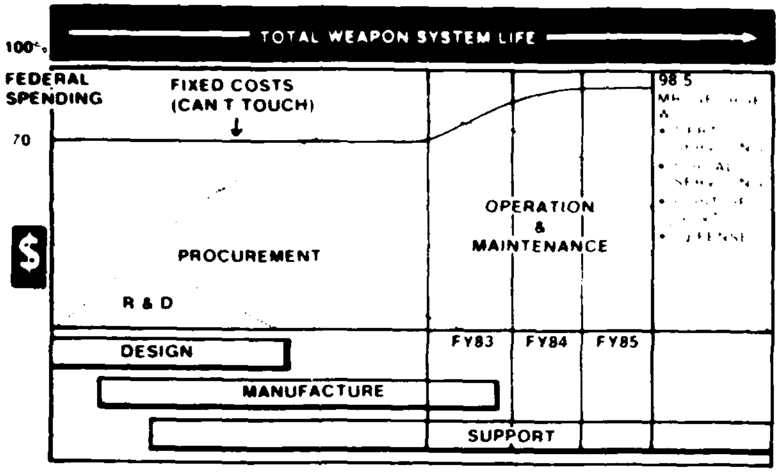
MANPOWER CONSTRAINTS



MILITARY MANPOWER POOL PERCENTAGE CHANGE IN 17 TO 19 YEAR OLD U.S. MALE POPULATION, 1976-1990

- DECREASED SUPPLY → TIGHTENED LABOR MARKET → INCREASED WAGES → INCREASED USAF FIXED COSTS

WEAPON SYSTEM COST VS TIME



IMPLICATIONS FOR THE FUTURE

- AF PLANNER "UP AGAINST THE WALL"
  - •• THREAT EXPLOSION - MANPOWER MATERIALS SHORTAGES
  - •• WHERE, WHEN, HOW LONG, WHAT LEVEL OF CONFLICT
  - •• WHO WILL PLAY - LOC DISTRIBUTION - REDUCED SANCTUARY
  - •• TECHNOLOGICAL COMPLEXITY
- AF 2000
  - •• OPERATIONAL SUPPORT STRUCTURE
    - ••• MOBILE-FLEXIBLE-SURVIVABLE
- TRADITIONAL OPERATIONAL SUPPORT STRUCTURE

"HOBBLES" ON THE WARRIOR

IMPLICATIONS FOR THE FUTURE (CONTINUED)

PERSPECTIVE

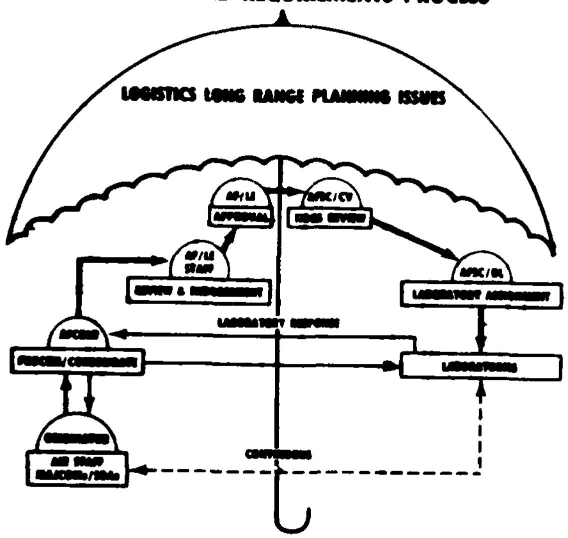
WE ARE NOT TALKING FINE TUNE REDUCTIONS OF 5 TO 10%.
WE ARE TALKING ABOUT MAJOR SURGERY OF 50-80%.

- MANPOWER
- SPARES
- TECH DATA
- INFRASTRUCTURE
- TRAINING

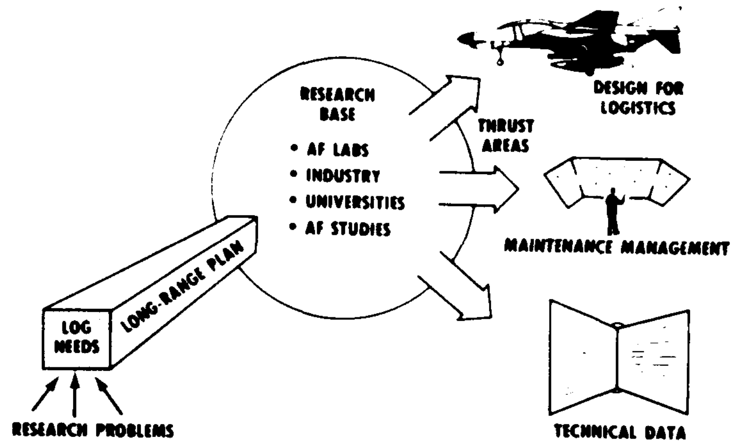
THE GENERAL AVIATION INDUSTRY HAS ENTERED INTO A MORE COMPLEX AND TROUBLED PERSONNEL ERA THAN HAS PREVIOUSLY BEEN EXPERIENCED. A SUCCESSFUL RESPONSE WILL REQUIRE COMPREHENSIVE PLANNING THAT IS INTEGRALLY LINKED TO BUSINESS STRATEGIES. THIS WILL REQUIRE A BREAK WITH TRADITION. IN THE PAST, BUSINESS PRODUCTS HAVE DETERMINED PERSONNEL REQUIREMENTS. IN THE FUTURE, PERSONNEL AVAILABILITY WILL TO A GREAT EXTENT DETERMINE THE AVAILABILITY OF THE PRODUCTS OF GENERAL AVIATION.

TECHNOLOGICAL ADVANCEMENTS AND GENERAL EXPANSION IN BOTH CIVILIAN AND MILITARY SECTORS DURING THIS DECADE WILL ACCELERATE THE DEMAND FOR ENGINEERING AND RELATED TECH TALENT. THERE WILL BE A PRESSING REQUIREMENT FOR THESE SAME SKILLS FROM THOSE AMERICAN INDUSTRIES THAT HAVE SET THEIR COURSE TOWARD IMPROVING PRODUCTIVITY THROUGH NEW TECHNOLOGY. THE NEED FOR TECH TRAINED PERSONNEL WILL FAR EXCEED THE SUPPLY.

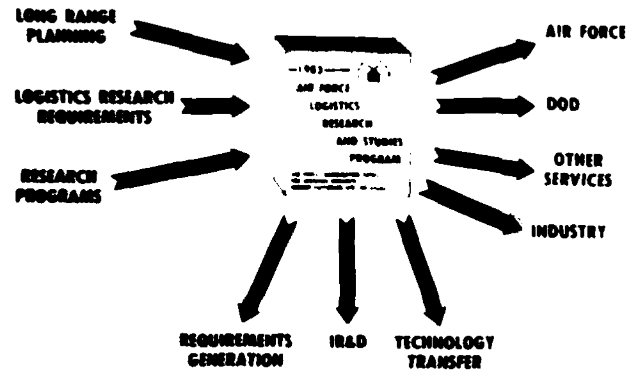
LOGISTICS R&D REQUIREMENTS PROCESS



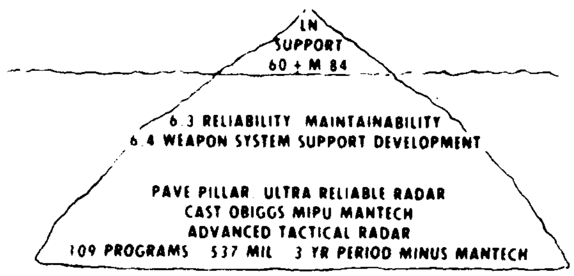
LOGISTICS RESEARCH AND DEVELOPMENT



LOGISTICS RESEARCH PROGRAM DOCUMENT



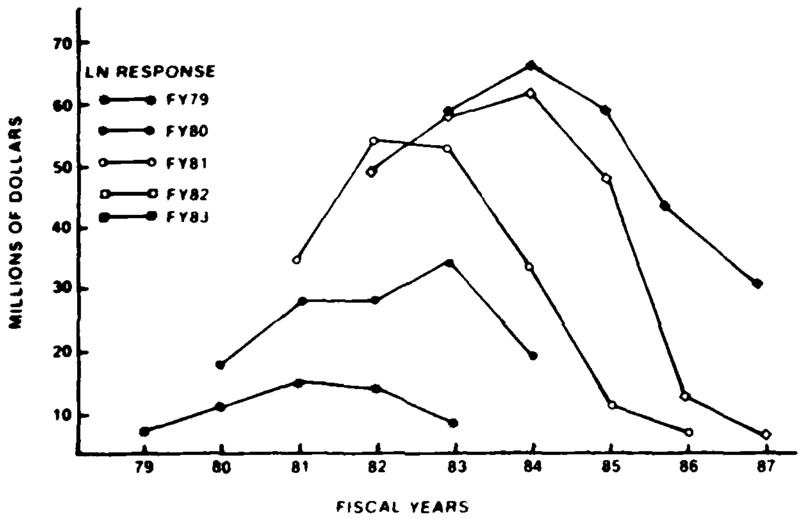
TIP OF THE ICEBERG
LOGISTICS R&D



BOTTOM LINE

- MANY PERFORMANCE ORIENTED PROJECTS HAVE LOGISTICS FALL OUT BENEFITS
- GREATEST PAYOFF INCREASED AWARENESS AND EMPHASIS ON SUPPORTABILITY

TARGETED LN SUPPORT AS OF FY PLAN



CONTRACTOR INDEPENDENT RESEARCH AND DEVELOPMENT

WHAT: CONTRACTORS DO IT ON THEIR OWN BASED ON WHAT THEY PERCEIVE WE NEED

WHY: THEY SPEND ABOUT 3 BILLION DOLLARS. WE (DOD) REIMBURSE THEM ABOUT 1 BILLION (1/3)

HOW: GETTING LOGISTICS ENGINEERS INVOLVED IN GRADING THEIR PROJECTS

WHO: ALL THREE SERVICES - JLC ENDORSED 22 JUN 83

FY 83 IR&D PARTICIPATION AS OF 8 AUG 83

	PROJECT EVALUATIONS	ON-SITES
WR-ALC	11	
OO-ALC	67	2
OC-ALC	70	1
SA-ALC	54	
SM-ALC	77	3
AGMC	185	7
HQ AFLC/LO	263	4
HQ AFLC/MA	35	
HQ AFLC/XRS	4	
AFALD	157	17
AFOTEC	93	
AFCOLR	51	2
OTHER	19	1
TOTAL	1086 (UP FROM 500 FY 82)	37

DIALOGUE

A NEW DIMENSION IN WEAPON SYSTEMS DESIGN

- THREE SENIOR COMMANDERS
- SAME MESSAGE
- SAME AUDIENCE TARGET

LAB SCIENTIST DESIGN ENGINEER

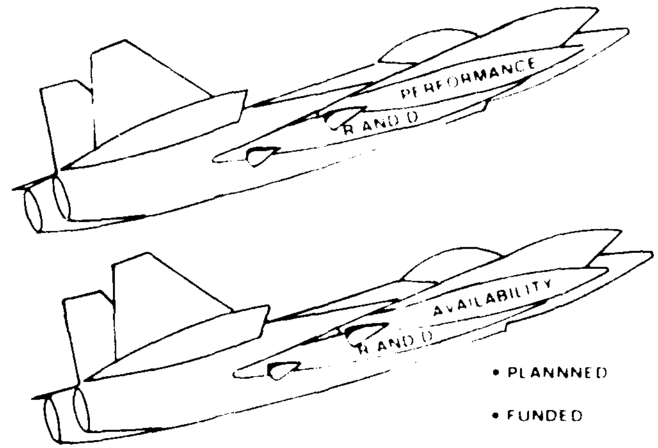
SENIOR LEVEL VISITS

- EXECUTIVE TO EXECUTIVE COMMUNICATION
- EMPHASIZE SUPPORTABILITY
- CHAPTER 5. AIR FORCE 2000

ONE COMPANY'S RESPONSE

"WE CAN GAIN A FAVORABLE CUSTOMER RESPONSE BY CLEARLY DISPLAYING THE CONNECTION OF OUR PROJECTS TO WEAPON SYSTEM READINESS AND SUPPORT ENHANCEMENTS ... REVIEW THE SERVICE LOGISTICS NEEDS AND LONG-RANGE PLANS TO DETERMINE IF OUR ON-GOING PROJECTS ARE RESPONSIVE OR PERHAPS SHOULD BE REDIRECTED FOR MAXIMUM MUTUAL ADVANTAGE. IN VIEW OF SHIFTING PRIORITIES, IT MAY BE TIMELY TO CLOSE OUT SELECTED PROJECTS AND BEGIN NEW RESPONSIVE PROJECTS WITH EMERGING TECHNOLOGIES IN AREAS WITH GREATER BENEFIT POTENTIAL

IN FORMATION



- PLANNNED
- FUNDED
- EXECUTED

TOGETHER ALL THE TIME

Session IV

Session IV
Logistics Research and Development in Industry

SESSION IV PANELISTS

Chairman: George Mohr · Westinghouse Electric Corporation

Garth Payne · FMC Corporation

Jim Duhig · Lockheed Georgia Company

Mark Pittenger · Boeing Aerospace Company

- Can logistics R&D make a difference?
  - Where?
  - How?
- What is industry's *role*?
  - Management commitment?
  - Technology applications?
- What is the future of logistics R&D?
  - Institutionalized?
  - Short term?

RESEARCH AND DEVELOPMENT

[illegible]

VIEW GRAPH #[illegible]

[illegible]

VIEW GRAPH #

[illegible]

VIEW GRAPH #[illegible]

A[illegible] SHOWN ON THIS [illegible] THE [illegible] PRESENTATION WILL [illegible] ORGANIZED [illegible] INDEPENDENT [illegible] RESEARCH AND DEVELOPMENT AND AN OVERVIEW OF SELECTED [illegible] PROJECT[illegible] [illegible] OF THE PRESENTATION, A VIDEOTAPE WILL BE SHOWN [illegible] THE [illegible] PROJECT.

[illegible] COMPANY STRATEGIC OBJECTIVES AND PLANS, CUSTOMER NEEDS AND TECHNOLOGICAL DEVELOPMENTS. THE RESULT OF THIS REVIEW INDICATED WE NEEDED A DEDICATED [illegible] RESEARCH AND DEVELOPMENT PROGRAM, [illegible] ORGANIZATION PARTICIPATED AND [illegible] PARTICIPATE ACTIVELY IN ENGINEERING [illegible] PRODUCTS AND THEIR PRODUCTION [illegible]

VIEW GRAPH #3

WE ESTABLISHED OUR LOGISTICS SUPPORT OBJECTIVES IN CONJUNCTION WITH OTHER ELEMENTS OF ORDNANCE DIVISION. WE LOOKED AT BOTH DOMESTIC AND INTERNATIONAL CUSTOMER FIELD SUPPORT NEEDS. WE EXAMINED OUR PRESENT WEAPON SYSTEM PRODUCT LINES AND OUR PRESENT LOGISTICS PRODUCTS. WE LOOKED AT OUR LOGISTIC PRODUCTION PROCESSES AND ASSOCIATED COSTS, AND FINALLY, WE LOOKED AT NEW TECHNOLOGIES FOR POSSIBLE APPLICATION.

VIEW GRAPH #

[illegible] PROGRAMS WERE INITIATED [illegible] UNDER DEVELOPMENT [illegible]

VIEW GRAPH #[illegible]

[illegible] IN THE MARKET [illegible] THE MARKET TODAY [illegible] MODATE BOTH DEVELOPMENT AND PRODUCTION [illegible] APPLICATIONS. ON ONE HAND, WE NEED AN INTERACTIVE [illegible] THE [illegible] ITERATIVE [illegible] APPLICATION. ON THE OTHER HAND, WE REQUIRE A HANDS-OFF BATCH [illegible] PRODUCTION OF MATURE PUBLICATION.

IT DIDN'T TAKE US TOO LONG TO REALIZE THAT WE WERE DESTINED TO BECOME THE SYSTEM INTEGRATOR OF 3 MAJOR SUB SYSTEMS. FIRST, A TEXT PROCESSING SYSTEM, NEXT, A COMPUTER GRAPHICS SYSTEM, AND FINALLY, A TEXT ART MERGE SYSTEM. OUR REQUIREMENTS FOR CAPS ALSO CALL FOR EFFECTIVE COMMUNICATIONS WITH THE IN-PLACE CAD-CAM EQUIPMENT AS WELL AS FUTURE TECHNICAL INFORMATION SYSTEMS. IN ADDITION TO THESE NEEDS, WE WERE FACED WITH THE UNKNOWNS OF CUSTOMER ACCEPTANCE OF DIGITIZED FORMATS, AND PROBABLE CHANGES OR DEVIATION TO SPECIFICATIONS AND STANDARDS.

WHEN ALL OF THESE UNCERTAINTIES WERE SUMMED AND A FEW OTHER FACTORS ADDED, IT WAS DECIDED THAT WE SHOULD DEVELOP AND TEST A CAPS PROGRAM THEN [illegible] IT WOULD MEET OUR CUSTOMER NEEDS AS WELL AS OUR OWN. INTERESTINGLY ENOUGH, WE FOUND OUT NOT TOO LONG AGO THAT OUR DoD CUSTOMERS ALSO HAVE SIMILAR OBJECTIVES AND TEST PROGRAMS.

THE FMC CAPS PROGRAM INCLUDES A STUDY OF THE FEASIBILITY OF COMPLETE AUTOMATION FOR THE PRODUCTION OF TECHNICAL MANUALS, A SURVEY OF TEXT PROCESSING AND COMPUTER GRAPHICS VENDORS AND INDUSTRY USERS, AND, A TEST IMPLEMENTATION PROGRAM. WE ARE PRESENTLY IN THE TEST/IMPLEMENTATION PHASE OF THE PROGRAM.

(VIEW GRAPH #9)
THE TEST AND IMPLEMENTATION PROGRAM CONSISTS OF 3 PHASES. FIRST IS THE IMPLEMENTATION OF TEXT PROCESSING, NEXT IS THE TEST AND IMPLEMENTATION OF COMPUTER GRAPHICS, AND FINALLY, IS THE TEST AND IMPLEMENTATION OF TEXT AND ART MERGE. WE PLAN TO ENHANCE AND EXPAND THE SYSTEM IN FUTURE YEARS AS THE NEED ARISES AND THE TECHNOLOGY CHANGES. THE SECOND PROJECT TO BE PRESENTED TODAY IS THE FMC INTERACTIVE TECHNICAL MANUAL AND TRAINING PROJECT.

(VIEW GRAPH #10)
IN THE EARLY 1970'S THE U.S. ARMY BECAME CONCERNED OVER THE ANTICIPATED FIELDING OF A NEW ERA OF WEAPONRY AND ITS IMPACT ON LOGISTICS, AND THE PERSONNEL STRUCTURE OF ARMY FORCES. THE NEW GENERATION OF WEAPON SYSTEMS WOULD REQUIRE COMPLEX OPERATIONS, AND NEW OR ENHANCED MAINTENANCE SKILLS AND PROCEDURES. IN ORDER TO ENSURE THAT THESE SKILLS COULD BE DEVELOPED, THE ARMY EMBARKED ON A PROGRAM TO REVAMP ITS TECHNICAL DOCUMENTATION AND TRAINING MATERIALS. THE RESULT WAS THE SKILL PERFORMANCE AIDS SYSTEM (SPA). THE SPA SYSTEM WAS DESIGNED TO CLOSE THE "SKILL GAP" BY ALLOWING SOLDIERS TO TRAIN THEMSELVES ON-THE-JOB FOR PROPER OPERATION AND MAINTENANCE OF ADVANCED WEAPONRY. WHILE THE SPA SYSTEM PROVIDED "STATE-OF-THE-ART", USER-ORIENTED TECHNICAL MATERIALS, THE VOLUME OF DOCUMENTATION INCREASED EXPONENTIALLY OVER PREVIOUS PRODUCTS. THE ARMY WAS "DROWNING" IN PAPER. A SYSTEM DESIGNED TO BE "USER FRIENDLY" WAS IN FACT BECOMING A USER BURDEN.

RECOGNIZING THIS PROBLEM THE ARMY ORGANIZED AN EFFORT TO INVESTIGATE THE APPLICATION OF TECHNOLOGY TO SOLVE THE LOGISTICS, OPERATION, MAINTENANCE AND TRAINING PAPER PROBLEM WHILE RETAINING THE COMMITMENT TO USER ORIENTED DOCUMENTATION.

THE ARMY COMMUNICATIVE TECHNOLOGY OFFICE (ACTO) WAS GIVEN THIS MISSION. IN EARLY RESEARCH ACTO DECIDED THAT LASER VIDEODISC PROVIDED THE MOST VIABLE ANSWER FOR STORAGE AND RETRIEVAL OF THE ARMY'S INFORMATION. ACTO BEGAN A SERIES OF PROJECTS TO TEST APPLICATIONS THAT WOULD MEET ARMY REQUIREMENTS IN TRAINING AND LOGISTICS. ACTO SHOWED THAT MICRO COMPUTER CONTROLLED VIDEODISC COULD PRESENT MAINTENANCE AND TRAINING MATERIALS IN A COST EFFECTIVE MANNER.

IN 1982 FMC CORPORATION ORDNANCE DIVISION PROPOSED AND FUNDED AN INDEPENDENT R&D PROJECT TO DEVELOP A MODEL OF A TECHNICAL MANUAL ON MICROCOMPUTER CONTROLLED LASER VIDEODISC. THE OBJECTIVE WAS TO ADAPT THE SPA SYSTEM MANUALS AND TRAINING MATERIALS FOR PRESENTATION ON INTERACTIVE VIDEODISC IN AN EASY-TO-USE FASHION.

THE STUDY OBJECTIVE WAS TWOFOLD: FIRST, DEVELOP AN INCLUSIVE TRAINING DESIGN OF TROUBLESHOOTING, MAINTENANCE AND TRAINING AIDS ACCOMMODATING MULTI SKILL LEVEL PERSONNEL, AND SECONDLY, IMPLEMENT THIS DESIGN FOR MILITARY TRAINING BY DEVELOPING AND PRODUCING A VIDEODISC. TO ACCOMPLISH THIS, EXPERIMENTATION WITH NUMEROUS DESIGN AND PRODUCTION TECHNIQUES WAS NECESSARY. THESE TECHNIQUES INCLUDED: FOUR

FRAME FORMAT, COMPUTER GENERATED GRAPHICS, AND HIGH LEVEL BRANCHING TO MAXIMIZE PROGRAM EFFECTIVENESS FOR EXPERT, APPRENTICE AND NOVICE USERS.

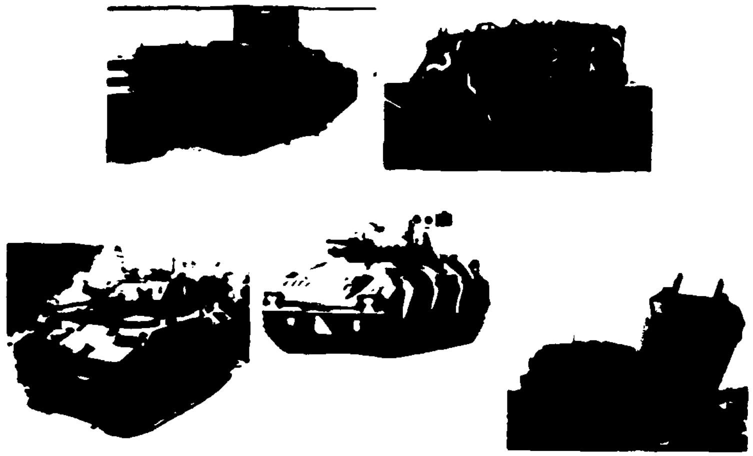
THE RESULTING PROGRAM EXHIBITS A ONE TASK "SLICE" OF THE ORGANIZATIONAL MAINTENANCE MANUAL FOR THE BRADLEY TURRET (WEAPON STATION) SYSTEM. (SHOW KEYPAD.) IT IS ACCESSED BY USE OF AN [illegible] SEVEN BUTTON KEYPAD. THE MICROCOMPUTER PROGRAM CAN BE RUN ON AN APPLE IIE OR SONY SMC 70 MICROCOMPUTER. ALL VIDEO INFORMATION, INCLUDING TEXT, IS ON THE VIDEODISC.

THE VIDEO WHICH YOU ARE ABOUT TO SEE FIRST GIVES A BRIEF INTRODUCTION TO THE DESIGN OF THIS PROGRAM. IT THEN PROCEEDS THROUGH ONE TROUBLESHOOTING TREE AND ONE MAINTENANCE PROCEDURE.
(SHOW VIDEOTAPE).

OUR PROGRAM IS DESIGNED TO GARNER DATA SUFFICIENT FOR DEVELOPMENT OF A MILITARY SPECIFICATION FOR VIDEODISC TECHNICAL MANUALS. USER RESPONSE HAS BEEN VERY SUPPORTIVE AND ENTHUSIASTIC AS WE ENTER THE NEXT PHASE. THIS CONCLUDES MY PRESENTATION.

FMC Logistics

Research and Development



Logistic Objectives

- Improve Supportability
- Decrease support costs
- Apply new technologies

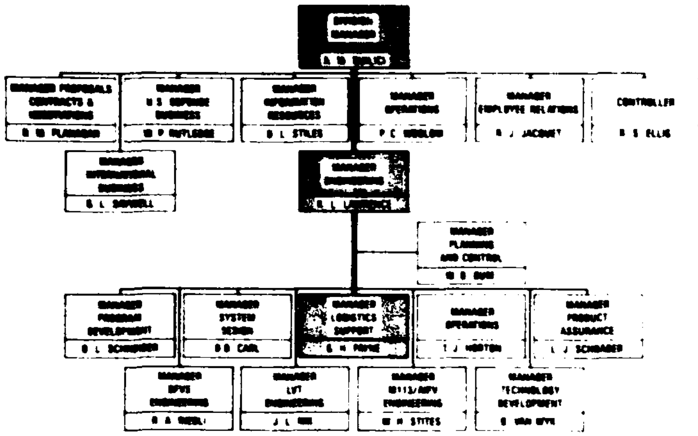
Outline

- Introduction
- Approach
- Organization
- Selected projects
- Videotape presentation

FMC Approach

- Enhance support of combat vehicle product lines
- Improve supportability of new systems
- Increase productivity of logistics product lines

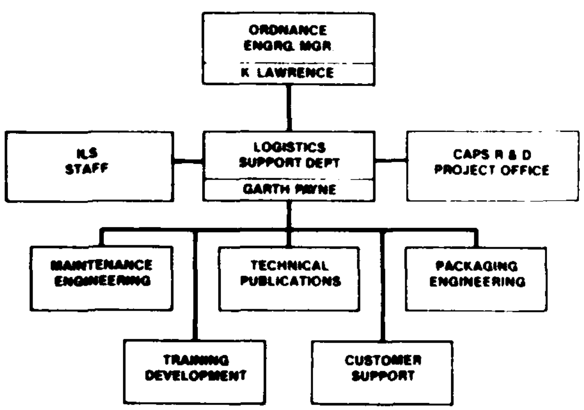
FMC Organization
Ordnance Division



Logistic R&D Projects

- Computer-Aided Publications System (CAPS)
- Videodisc training project

Logistics Support Department

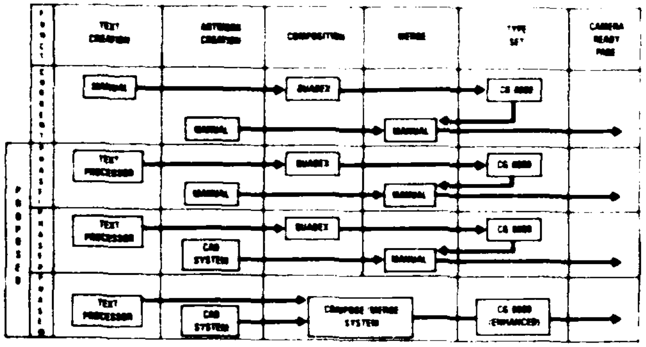


CAPS Objectives

- Reduce production costs of manuals
- Decrease publication leadtimes
- Improve master file management
- Accommodate digitized database integration

CAPS Development

FMC



Videodisc Training Project

FMC

- Improved training materials
- Documentation explosion
- Industry/Government response
- FMC approach
- Videotape

AMERICAN DEFENSE PREPAREDNESS ASSOCIATION'S SECOND ANNUAL
INTEGRATED LOGISTICS SUPPORT SYMPOSIUM

November 30 to December 2, 1983

Session IV - Logistics Research and Development in Industry

Presentation by: James J. Duhig, Jr.
Manager, ILS Analysis and Requirements Department
Lockheed-Georgia Company

ABSTRACT

An industry response is outlined to the DoD challenge calling for weapon systems that can sustain high sortie rates over reasonable periods of time without needing to carry appreciable maintenance or support resources. An integrated approach to wartime capability analysis is described covering requirements analysis, emerging doctrines and operational concepts, and an array of active modeling tools. Key technologies are reviewed and examples of innovative solutions to support problems are shown in the areas of structures and materials, functional systems, electronics, automatic test equipment and maintenance management. To realize the readiness and support payoff requires a multi-disciplinary technology integration. In conclusion some of the technical issues which must be addressed by the military - industry team are summarized.

BIOGRAPHY

As manager of the Lockheed-Georgia Company Integrated Logistics Support Analysis and Requirements Department, Mr. Jim Duhig is responsible for directing the development of advanced Integrated Logistics Support concepts, plans, systems and programs. A major objective of the ILS Analysis and Requirements Department is to ensure that supportability requirements for new programs are defined early and are incorporated into the design process in a cost-effective manner. Mr. Duhig recently cochaired a company Task Force on Independent Research and Development to secure greater emphasis on improved weapon system readiness and support. During the past few years Mr. Duhig worked as a Principal Investigator on logistics research to improve wartime airlift surge capability, as ILS Coordinator on the USN EC-X program and R&M Study Leader on the USAF C-5B and C-X Proposals. Since joining Lockheed in 1954 as an Engineering Cooperative Trainee, Mr. Duhig has held a variety of positions in Product Support, Engineering, Manufacturing and Quality Assurance involving aircraft system analysis, development, test and evaluation. Education includes BSME (1959) and MSME (1963) degrees from the Georgia Institute of Technology. He is a member of the Society of Logistics Engineers, the National Management Association and is an elected officer of the American Institute of Aeronautics and Astronautics, Atlanta Section. Mr. Duhig has served on AIAA and SAE technical committees at the national level and is the author of numerous reports, proposals and published papers.

LOGISTICS RESEARCH AND DEVELOPMENT IN INDUSTRY

THIS AFTERNOON I WOULD LIKE TO PRESENT A VIEW OF LOGISTICS RESEARCH DEVELOPMENT IN INDUSTRY BASED ON THE CURRENT ACTIVITIES OF THE LOCKHEED-GEORGIA COMPANY. WE DESIGN, DEVELOP AND BUILD MILITARY TRANSPORT AIRCRAFT, SUCH AS THE C-130, THE C-141 AND THE C-5, AT LOCKHEED IN MARIETTA, GEORGIA. WE, THEREFORE, ARE KEENLY AWARE OF THE IMPORTANCE OF WEAPON SYSTEM READINESS AND SUPPORT, AND WE ARE VIGOROUSLY ENGAGED IN INCORPORATING THESE CAPABILITIES INTO OUR PRODUCTS. TO DO SO REQUIRES A WIDE RANGING ARRAY OF RESEARCH AND DEVELOPMENT. IN THIS BRIEF PRESENTATION, I WILL DESCRIBE THE DEVELOPMENT OF LOGISTICS REQUIREMENTS AT THE FRONT END OF THE WEAPON SYSTEM DEVELOPMENT PROCESS. NEXT, SOME EXAMPLES OF HOW TECHNOLOGY IS BEING APPLIED TO SOLVE LOGISTICS PROBLEMS WILL BE SHOWN. FINALLY, SUGGESTIONS FOR IMPROVING THE LOGISTICS R&D AND IR&D PROCESS WILL BE OUTLINED.

READINESS DEFINITION

LET'S START WITH A DEFINITION OF READINESS. THIS ONE IS APPROPRIATE: "READINESS REFERS TO PROJECTED CAPABILITY TO MEET THE INITIAL AND SUSTAINED COMBAT REQUIREMENTS OF ONE OR MORE SPECIFIC WARTIME SCENARIOS." THE EMPHASIS HERE IS ON WARTIME CAPABILITY.

D O D READINESS AND SUPPORTABILITY OBJECTIVES

IN AN ADDRESS EARLIER THIS YEAR, DR. WEBSTER STATED THAT A READINESS AND SUPPORTABILITY OBJECTIVE OF THE DEPARTMENT OF DEFENSE IS TO "DEVELOP CAPABILITY TO DESIGN WEAPON SYSTEMS THAT CAN SUSTAIN HIGH SORTIE RATES OVER REASONABLE PERIODS OF TIME, PERHAPS 30 TO 90 DAYS, WITHOUT NEEDING TO CARRY APPRECIABLE MAINTENANCE OR SUPPORT RESOURCES." I WOULD LIKE TO FOCUS ON THE FIRST PART OF THIS OBJECTIVE, "DEVELOP CAPABILITY TO DESIGN," FOR THIS STATEMENT VERY PERCEPTIVELY NOTES THAT THE MILITARY-INDUSTRY TEAM HAS NOT YET MASTERED THIS EXTREMELY COMPLEX TASK. BUT WE ARE WORKING ON IT AND MAKING GOOD PROGRESS.

INTEGRATION OF READINESS AND SUPPORTABILITY FACTORS

CONCEPTUALLY, THE PROCESS OF INTEGRATING READINESS AND SUPPORTABILITY FACTORS INTO THE DESIGN OF A WEAPON SYSTEM IS STRAIGHT FORWARD. YOU TAKE PRODUCT PERFORMANCE FEED-BACK AND LESSONS LEARNED FROM EXISTING SYSTEMS AND COMBINE THAT WITH THE ADVANTAGES OFFERED BY NEW TECHNOLOGY. THEN YOU ORCHESTRATE ALL OF THE AFFECTED DISCIPLINES, AND ONLY A SMALL SAMPLE ARE SHOWN HERE, TO PRODUCE THE WEAPON SYSTEM DESIGN. YOU START BY DEVELOPING REQUIREMENTS UP FRONT IN THE PRE-CONCEPTUAL PHASE.

REQUIREMENTS ANALYSIS APPROACH

THE REQUIREMENTS ANALYSIS PROCESS BEGINS BY REVIEWING DEFENSE OBJECTIVES AND SERVICE DOCTRINES. COMBAT SCENARIOS AND OPERATIONAL CONCEPTS ARE ESTABLISHED FOLLOWED BY REQUIREMENTS STUDIES AND ANALYSES. PRELIMINARY SYSTEM REQUIREMENTS ARE DEVELOPED, FROM WHICH THE PRELIMINARY DESIGN OF ALTERNATIVE SYSTEMS CAN BE PREPARED. THESE ALTERNATIVE SYSTEM DESIGNS ARE THEN EVALUATED FOR COST AND EFFECTIVENESS, LEADING TO THE PREFERRED SYSTEM SPECIFICATION.

CONCURRENT READINESS AND SUPPORT REQUIREMENTS

CONCURRENT WITH AND AS AN INTEGRAL PART OF THIS FRONT END ANALYSIS IS THE DEVELOPMENT OF READINESS AND SUPPORT REQUIREMENTS. MIL-STD-1388-1A DOES A MASTERFUL JOB OF DEFINING A LOGICAL SERIES OF TASKS STARTING WITH THE FORMULATION OF A LOGISTICS SUPPORT ANALYSIS STRATEGY. THE LSA PLAN AND THE USE STUDY RELATE TO THE ESTABLISHMENT OF SCENARIOS AND OPERATIONAL CONCEPTS. REQUIREMENTS STUDIES INCLUDE STANDARDIZATION CONSIDERATIONS, THE DEVELOPMENT OF BASELINE COMPARISON SYSTEMS AND ASSESSMENT OF TECHNOLOGICAL OPPORTUNITIES. PRELIMINARY SYSTEM REQUIREMENTS CONTAIN SUPPORTABILITY AND SUPPORTABILITY RELATED DESIGN FACTORS. THUS, THE PRELIMINARY DESIGNS ARE NOW BASED ON NOT ONLY PERFORMANCE REQUIREMENTS, BUT ALSO ON ANALYTICALLY BASED READINESS AND SUPPORTABILITY REQUIREMENTS. THE COST/EFFECTIVENESS EVALUATIONS INVOLVE TRADE-OFFS OF PRELIMINARY DESIGNS AND ALTERNATIVE SUPPORT SYSTEMS LEADING TO A FUNCTIONAL WEAPON SYSTEM BASELINE THAT IS DOCUMENTED IN A PREFERRED SYSTEM SPECIFICATION. ALL OF THAT IS A LOT EASIER SAID THAN DONE. EACH STEP REQUIRES SPECIALIZED ANALYTICAL TOOLS, DATA BASES AND EXPERTISE, WHICH ARE PRODUCTS OF LOGISTICS RESEARCH AND DEVELOPMENT.

QUANTIFYING IMPACT OF EMERGING DOCTRINES AND CONCEPTS

DEFENSE OBJECTIVES AND SERVICE DOCTRINES ARE CONTINUALLY EVOLVING. SOME OF THE CURRENT DOCUMENTS OF INTEREST ARE LISTED. QUANTIFYING THE IMPACT OF THESE DOCTRINES AND FUTURE OPERATIONAL CONCEPTS REQUIRES THE USE OF COMPLEX ANALYTICAL AND SIMULATION MODELING TECHNIQUES.

TOTAL MOBILITY SYSTEM ANALYSIS PROCESS

AS I STATED AT THE OUTSET, THE LOCKHEED-GEORGIA COMPANY BUILDS AIRLIFTERS. THIS REQUIRES A CAPABILITY TO ANALYZE THE COMBAT EFFECTIVENESS OF ALTERNATIVE MOBILITY PROGRAMS. THE TOTAL MOBILITY SYSTEM ANALYSIS PROCESS IS DEPICTED HERE. EACH OF THE IMPUTS TO THE TOTAL MOBILITY SYSTEM MODEL IS THE RESULT OF YEARS OF INDEPENDENT RESEARCH AND DEVELOPMENT, MUCH OF IT GENERICALLY REFERRED TO AS LOGISTICS RESEARCH. A SIGNIFICANT CHALLENGE IN THIS PROCESS IS THE DEVELOPMENT OF INPUTS THAT ARE REPRESENTATIVE OF OPERATIONS UNDER WARTIME CONDITIONS. WE HAVE EXTENSIVE PEACETIME DATA BASES, BUT FAILURE RATES, FIX TIMES, SUPPORT CONCEPTS AND SURGE RATES ARE SUBSTANTIALLY DIFFERENT DURING WAR. OUR WARTIME INPUT DATA AND MODEL LOGIC MUST BE CORRECT, VISIBLE AND JUSTIFIABLE IF OUR ANSWERS ARE TO BE CREDIBLE.

WARTIME CAPABILITY ASSESSMENT TECHNOLOGY

COMPUTER BASED WARTIME CAPABILITY ASSESSMENT TECHNOLOGY IS ADVANCING RAPIDLY. LISTED HERE ARE FOUR SPECIFIC TECHNOLOGIES CONTRIBUTING TO THIS CAPABILITY ADVANCEMENT. FIRST, THE AVAILABILITY OF LARGE COMPUTER SYSTEM NETWORKS ALLOWS THE DEVELOPMENT AND EFFICIENT USE OF MORE REALISTIC MODELS FOR WARTIME CAPABILITY ASSESSMENT. THESE MODELS CAN BE INTERFACED SO THAT ONE DRIVES ANOTHER.

NEXT, THE AVAILABILITY OF DATA BASE MANAGEMENT PROGRAMS GIVE THE ANALYST TREMENDOUS LEVERAGE ON LARGE AMOUNTS OF DATA. WHAT TOOK MONTHS CAN NOW BE DONE IN MINUTES.

COMPUTER COLOR GRAPHICS PERMIT PICTORIAL COMMUNICATION OF COMPLEX INTERSECTING ANALYSIS RESULTS. BEFORE THIS WE LITERALLY COULD NOT SEE THE FOREST FOR THE TREES.

AND FINALLY, IT IS ONLY WITH THE ADVENT OF THE NEW SUPER COMPUTERS THAT COMBAT OUTCOME MODELS HAVE BECOME PRACTICAL TOOLS WHICH CONSIDER INTERACTIONS AMONG MANY PROCESSES.

TECHNOLOGY IN SUPPORTABILITY

I WOULD NOW LIKE TO REVIEW SOME OF THE INDEPENDENT RESEARCH AND DEVELOPMENT PROJECTS UNDERWAY AT LOCKHEED TO ENHANCE WEAPON SYSTEM READINESS AND SUPPORTABILITY.

RELIABILITY, MAINTAINABILITY, AND LOGISTICS REQUIREMENTS ARE BEING DEVELOPED WHICH WILL REALISTICALLY ENHANCE WARTIME AIRLIFT SURGE CAPABILITY.

BASED ON THE "CONCEPT 2000" STUDIES, MAINTENANCE AND SUPPORT CONCEPTS ARE BEING DEFINED FOR THE 21st CENTURY ENVIRONMENT.

ANALYSIS METHODS ARE BEING DEVELOPED AND TESTED WHICH PREDICT THE RELIABILITY OF COMPLEX, FAULT-TOLERANT, RECONGIFURABLE DIGITAL SYSTEMS.

PARAMETRIC ESTIMATING RELATIONSHIPS USED TO PREDICT RELIABILITY, MAINTAINABILITY AND AVAILABILITY VALUES UP FRONT ARE BEING UPDATED TO BE COMPATIBLE WITH THE NEW ADVANCED SUPPORT CONCEPTS.

ONGOING IS THE DEVELOPMENT OF COST EFFECTIVE PRODUCT IMPROVEMENTS FOR EXISTING SYSTEMS.

STRUCTURES AND MATERIALS TECHNOLOGY DEVELOPMENT

CORROSION INHIBITING COATINGS, NOW IN GENERAL USAGE AS MIL-P-87112, WERE DEVELOPED WHICH REDUCED CORROSION "GRIND OUTS" ON THE C-130 WINGS FROM 300 TO 2 DURING DEPOT MAINTENANCE. THE B-52 EXTERIOR HAS BEEN COATED WITH SIMILAR GOOD RESULTS.

CORROSION INHIBITING SEALANTS COMPLETELY ELIMINATES EXFOLIATION CORROSION AT FASTENER HOLES AND PROTECTS EXTERIOR FAYING SURFACES FROM CREVICE CORROSION. THIS MATERIAL IS IN GENERAL USAGE AS MIL-S-81733.

CRACK GROWTH INHIBITING SEALANTS LOWER CRACK GROWTH RATES BY A FACTOR OF TEN, THUS LOWERING INSPECTION COSTS AND EXTENDING SERVICE LIFE.

THE LOCKHEED CAPACITANCE HOLE PROBE REDUCES BOLT HOLE INSPECTION TIME FROM AS LONG AS 40 MINUTES TO JUST 3 SECONDS.

ACOUSTIC EMISSION SYSTEMS DETECT AND RECORD STRUCTURAL CRACKS AS THEY OCCUR PERMITTING MORE EFFICIENT STRUCTURAL INSPECTIONS.

STUDIES OF THE RELIABILITY OF NON-DESTRUCTIVE TESTS HAVE SHOWN CONCLUSIVELY THAT ONLY 10% OF NDT INSPECTORS ARE VERY PROFICIENT. 20% HAVE MARGINAL SKILLS AND 70% ARE NOT BETTER THAN CHANCE IN FINDING STRUCTURAL DEFECTS.

ELECTRONIC SYSTEMS TECHNOLOGY

THE REAL EXPLOSION IS IN THE ELECTRONIC SYSTEMS TECHNOLOGY INCLUDING: DIGITAL SIGNAL PROCESSING, ULTRASONICS, VERY LARGE SCALE INTEGRATION AND VERY HIGH SPEED INTEGRATED CIRCUITS, ELECTRONIC DISPLAYS, VOICE INTERFACE, TOUCH PANELS, SERIAL DATA BUS, AND LASER DISK TECHNOLOGIES. LOCKHEED AND THE REST OF INDUSTRY ARE BUSY DEVELOPING AND APPLYING THESE TECHNOLOGIES TO REVOLUTIONIZE THE CAPABILITIES OF OUR PRODUCTS.

ELECTRONICS TECHNOLOGY APPLICATIONS

HERE ARE SOME EXAMPLES OF ELECTRONICS TECHNOLOGY APPLICATIONS WITH OBVIOUS READINESS AND SUPPORTABILITY PAYOFFS.

WE ARE DEMONSTRATING ULTRASONIC LIQUID QUANTITY MEASUREMENT SYSTEMS WHICH TAKE ALL OF THE ELECTRICAL WIRING OUT OF THE FUEL TANKS. ALL ACTIVE COMPONENTS ARE MOUNTED EXTERNALLY. THE SYSTEM INCLUDES AUTOMATIC CALIBRATION AND FAULT ISOLATION.

IMPROVED FAILURE MONITORING AND RECORDING AND INFLIGHT DETERMINATION OF ENGINE BALANCE REQUIREMENTS CONTRIBUTE TO AIRCRAFT SELF-SUFFICIENCY SO VITAL IN WARTIME.

ADVANCED AUTOMATIC TEST EQUIPMENT IS SMALLER AND SMARTER.

APPLICATIONS ABOUND FOR REPLACEMENT OF OUTMODED EQUIPMENT WITH UP-TO-DATE ELECTRONICS TECHNOLOGY.

GROUND MANEUVERING UNDER WARTIME CONDITIONS IS ENHANCED BY WINGTIP OBSTRUCTION DETECTION DEVICES.

AND THE PAPER TECHNICAL ORDER WILL ONE DAY BE REPLACED WITH AN ELECTRONIC TECH ORDER SYSTEM FOR DISTRIBUTING STORING AND USING AIRCRAFT OPERATING AND MAINTENANCE INSTRUCTIONS.

INDEPENDENT RESEARCH AND DEVELOPMENT

INCENTIVES ARE NEEDED TO REDIRECT MORE OF INDUSTRY'S INDEPENDENT RESEARCH AND DEVELOPMENT RESOURCES TO READINESS AND SUPPORTABILITY ISSUES. ONGOING IR&D HAS A LOT OF MOMENTUM. REDIRECTION REQUIRES INCENTIVES. DOD GUIDELINES FOR THE 1984 IR&D PROGRAM MAKE WEAPON SYSTEM READINESS AND SUPPORTABILITY A SPECIAL INTEREST ITEM. THIS ACT HAS CERTAINLY GOTTEN THE ATTENTION OF IR&D MANAGERS IN INDUSTRY BUT QUESTIONS REMAIN. THEY ASK: WHAT ASSURANCE DO WE HAVE THAT BY REDIRECTING OUR IR&D WE WILL OBTAIN HIGHER SCORES OR THAT WE CAN NEGOTIATE A HIGHER IR&D FUNDING CEILING? THESE ARE PRACTICAL QUESTIONS AND THEY DESERVE PRACTICAL ANSWERS. OF COURSE THERE ARE LONGER RANGE PAYOFFS BASED ON ENHANCEMENTS IN COMPETITIVE CAPABILITIES. BUT SHORTER RANGE PAYOFFS ARE ALSO NEEDED.

A KEY ELEMENT TO SECURING REDIRECTED IR&D INVOLVES TRAINING AND AWARENESS ON THE IMPORTANCE OF LOGISTICS RESEARCH AND THE IMPACT ON WEAPON SYSTEM READINESS AND SUPPORT. THIS TRAINING AND AWARENESS IS NEEDED NOT ONLY IN INDUSTRY BUT ALSO WITHIN THE GOVERNMENT LABORATORIES AND SERVICES. THESE ARE THE PEOPLE WHO SCORE IR&D PROJECTS AND CONTRACT FOR R&D PROGRAMS.

LOGISTICS RESEARCH AND DEVELOPMENT

THERE IS CURRENTLY A LOT OF DOUBT IN INDUSTRY ABOUT GOVERNMENT FUNDED LOGISTICS RESEARCH AND DEVELOPMENT. ARE THE FUNDING LEVELS BEING TALKED ABOUT REALLY NEW R&D MONEY OR ARE THEY EXISTING BUDGETS THAT ARE REIDENTIFIED AS LOGISTICS R&D?

I BELIEVE THERE IS MUCH TO BE GAINED BY AN OPEN, WELL DOCUMENTED GOVERNMENT FUNDED LOGISTICS, R&D PROGRAM. LOGISTICS RESEARCH OBJECTIVES AND PRIORITIES OF THE DOD AND ALL SERVICES SHOULD BE CLEARLY DEFINED AS HAS BEEN DONE BY THE AIR FORCE COORDINATING OFFICE FOR LOGISTICS RESEARCH. INFORMATION ON AUTHORIZED FUNDING LEVELS AND FUNDED PROJECTS SHOULD BE READILY AVAILABLE. LONG RANGE PLANS SHOULD INCLUDE ROAD MAPS WITH PLANNED NEW STARTS INDICATED. ADMITTEDLY THIS IS A TOUGH ASSIGNMENT FOR A LARGE, MULTIFACETED OPERATION LIKE THE DOD, BUT WELL WORTH TAKING ON.

ALL TOO OFTEN R&D CONTRACTS HAVE TOO LITTLE IMPACT ON THE STATE-OF-THE-ART BECAUSE THE RESULTS ARE NOT ADEQUATELY PUBLICIZED. THE RESULT IS NEEDLESS DUPLICATION AND A WASTE OF OUR VALUABLE, FINITE RESOURCES. WE NEED TO ADVERTISE AND PROMOTE SIGNIFICANT R&D RESULTS.

SOURCE SELECTION CRITERIA

THERE CERTAINLY IS EVIDENCE OF THE INCREASED IMPORTANCE OF READINESS AND SUPPORTABILITY IN RECENT NEW WEAPON SYSTEM REQUESTS FOR PROPOSAL. THESE DOCUMENTS ARE FULL OF WELL DEFINED MEASURES OF EFFECTIVENESS FOR OPERATIONAL PERFORMANCE PARAMETERS INCLUDING READINESS AND SUPPORTABILITY. CONTRACTORS ARE INSTRUCTED TO CONDUCT TRADE STUDIES USING THE ELEMENTAL MEASURES OF EFFECTIVENESS AND THEN TO ARRIVE AT AN OVERALL, INTEGRATED WEAPON SYSTEM DESIGN. EACH CONTRACTOR IS LEFT TO HIS OWN METHODS OF INTEGRATING THE VARIOUS ELEMENTS INTO A PREFERRED DESIGN CONCEPT. THIS MAY BE ALL RIGHT FOR A PRE-CONCEPT DEFINITION PHASE. HOWEVER, DURING SUBSEQUENT PHASES OF THE COMPETITIVE PROCUREMENT, THE RFP SHOULD SPECIFY AN OVERALL MEASURE OF EFFECTIVENESS USING A WEIGHTED ARRAY OF PERFORMANCE, COST, SCHEDULE, READINESS AND SUPPORTABILITY PARAMETERS. MUCH WHEEL SPINNING CAN BE AVOIDED BY THIS DIRECT APPROACH.

CONCLUSION

WE ARE TOLD THAT NINETY PERCENT OF THE SCIENTISTS AND ENGINEERS THAT THE WORLD HAS PRODUCED IN ALL OF HISTORY ARE ALIVE AND PRACTICING THEIR TRADE TODAY. IT IS NO WONDER THAT TECHNOLOGY IS EXPLODING IN EVERY DIRECTION. WITH THE CLEAR PERCEPTION OF THE THREATS TO OUR NATIONAL DEFENSE, I BELIEVE THE MILITARY-INDUSTRY TEAM WILL MEET THE CHALLENGE, WILL HARNESS OUR INNOVATIVE TECHNOLOGICAL CAPABILITY

AND WILL PRODUCE AFFORDABLE SYSTEMS WITH THE REQUIRED LEVELS OF READINESS AND SUPPORT.

Logistics Research and Development In Industry

JAMES J. DUHIG, JR.
MANAGER, ILS ANALYSIS & REQUIREMENTS
LOCKHEED-GEORGIA COMPANY

Lockheed-Georgia Company

DoD Readiness and Supportability Objective

DEVELOP CAPABILITY TO DESIGN WEAPON SYSTEMS THAT CAN SUSTAIN HIGH SORTIE RATES OVER REASONABLE PERIODS OF TIME, PERHAPS 30-90 DAYS, WITHOUT NEEDING TO CARRY APPRECIABLE MAINTENANCE OR SUPPORT RESOURCES.

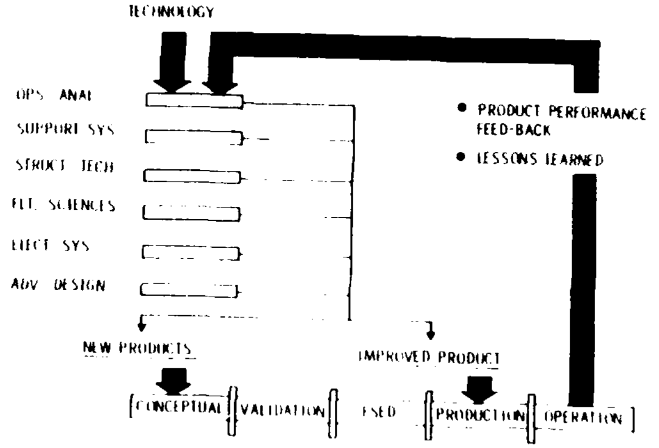
DR. RICHARD D. WEBSTER
DEPUTY ASSISTANT SECRETARY OF DEFENSE

Readiness Definition

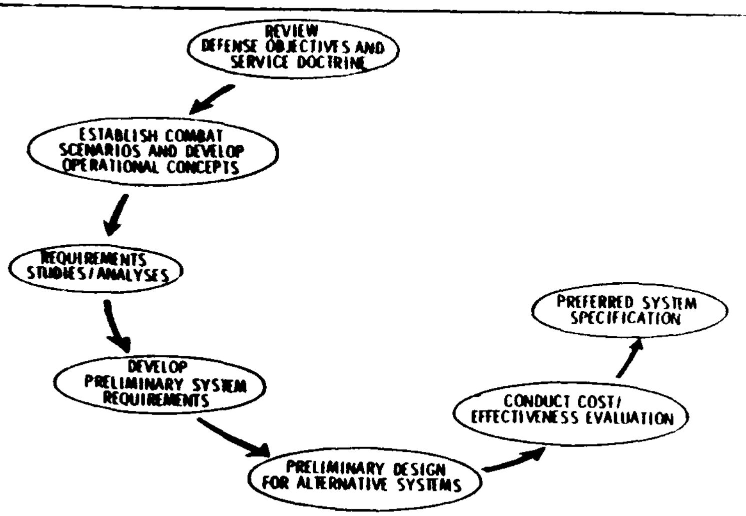
- READINESS REFERS TO PROJECTED CAPABILITY TO MEET THE INITIAL AND SUSTAINED COMBAT REQUIREMENTS OF ONE OR MORE SPECIFIC WARTIME SCENARIOS

RAND NOTE N-1797-AF

Integration of Readiness/ Supportability Factors

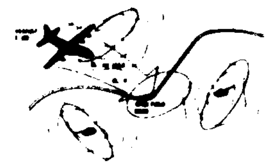


Lockheed-Georgia Company — Requirements Analysis Approach

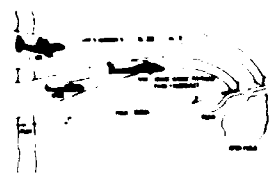


Lockheed-Georgia Company — Quantifying Impact of Emerging Doctrines/Concepts

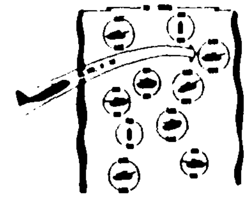
- AIRLAND BATTLE DOCTRINE
- AIRLAND BATTLE 2000 CONCEPT
- AIR FORCE 2000
- MARCOR 2000
- DESTINATION 2004



EMERGING TACTICAL ASSAULT ROLE

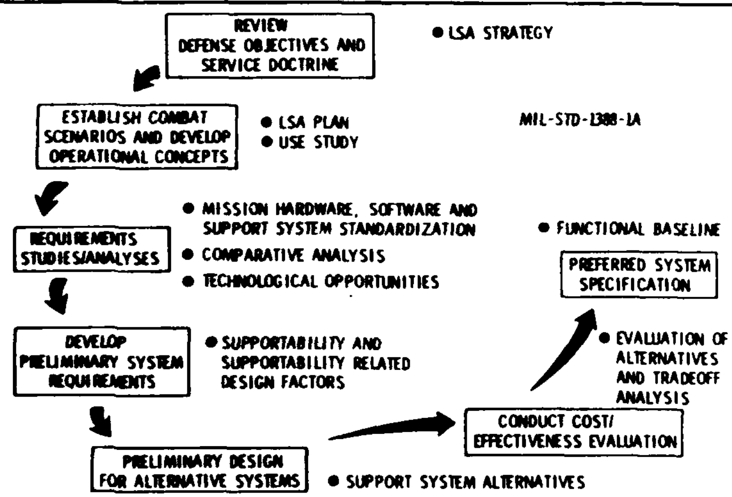


EXTENDED BATTLEFIELD RESUPPLY BY FIXED-WING AIRCRAFT

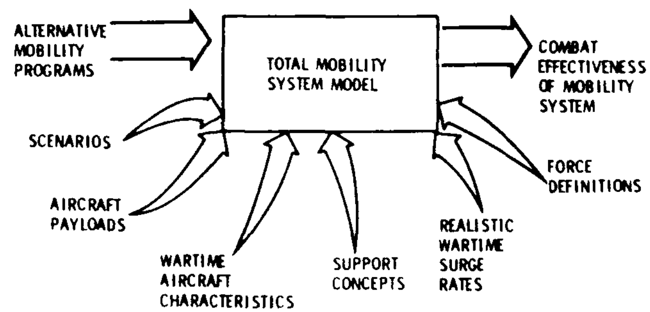


RESUPPLY TO "ISLANDS OF CONFLICT"

Lockheed-Georgia Company — Concurrent Readiness and Support Requirements



Lockheed-Georgia Company — Total Mobility System Analysis Process



Wartime Capability Assessment Technology

Lockheed-Georgia Company

- AVAILABILITY OF LARGE COMPUTER SYSTEM NETWORKS ALLOWS THE DEVELOPMENT AND EFFICIENT USE OF MORE REALISTIC MODELS FOR WARTIME CAPABILITY ASSESSMENT
- DATA BASE MANAGEMENT PROGRAMS GIVE THE ANALYST TREMENDOUS LEVERAGE ON HUGE AMOUNTS OF DATA
- COMPUTER COLOR GRAPHICS PERMIT PICTORIAL COMMUNICATION OF COMPLEX INTERSECTING ANALYSIS RESULTS
- COMBAT OUTCOME MODELS BECOME PRACTICAL TOOLS WHICH CONSIDER INTERACTIONS AMONG MANY PROCESSES

Structures and Materials Technology Development

Lockheed-Georgia Company

- CORROSION INHIBITING COATINGS
- CORROSION INHIBITING SEALANTS
- CRACK GROWTH INHIBITING SEALANTS
- CAPACITANCE HOLE PROBE
- ACOUSTIC EMISSION SYSTEMS
- NDT RELIABILITY STUDIES

Technology in Supportability

Lockheed-Georgia Company

- Develop Reliability Maintainability and Logistics Requirements for Enhanced Wartime Aircraft Surge Capability
- Define Maintenance and Support Concepts for 21st Century Environment.
- Improved Capability To Predict Reliability of Complex, Fault-Tolerant, Reconfigurable Digital Systems.
- Updating Reliability Maintainability and Availability Parametric Estimating Relationships To Be Compatible With Advanced Support Concepts.
- Cost Effective Improvements Being Developed for Existing Systems.

Electronic Systems Technology

Lockheed-Georgia Company

- DIGITAL SIGNAL PROCESSING
- ULTRASONICS
- VLSI/VHSIC
- ELECTRONIC DISPLAYS
- VOICE INTERFACE
- TOUCH PANELS
- SERIAL DATA BUS
- LASER DISK

Lockheed-Georgia Company

Electronics Technology Applications

- ULTRASONIC LIQUID QUANTITY MEASUREMENT
- IMPROVED FAILURE MONITORING AND RECORDING
- INFLIGHT DETERMINATION OF ENGINE BALANCE REQUIREMENTS
- ADVANCED AUTOMATIC TEST EQUIPMENT
- OUTMODED EQUIPMENT UPDATE
- WINGTIP OBSTRUCTION DETECTION FOR GROUND MANEUVERING
- AIRCRAFT AND GROUND MAINTENANCE TECH ORDER STORAGE

Lockheed-Georgia Company

Logistics Research and Development

GOVERNMENT FUNDED LOGISTICS R & D

- CLEARLY DEFINE OBJECTIVES AND PRIORITIES
- PUBLISH AUTHORIZED FUNDING LEVELS
- IDENTIFY FUNDED PROJECTS
- IDENTIFY PLANNED NEW STARTS
- PROMOTE R&D RESULTS

Lockheed-Georgia Company

Independent Research and Development

INCENTIVES NEEDED TO REDIRECT IRAD RESOURCES TO READINESS AND SUPPORTABILITY ISSUES

- HIGHER IRAD SCORES
- HIGHER IRAD CEILINGS
- TRAINING AND AWARENESS

Lockheed-Georgia Company

Source Selection Criteria

RFP'S SHOULD

SPECIFY AN OVERALL MEASURE OF EFFECTIVENESS
USING A WEIGHTED ARRAY OF PERFORMANCE, COST,
SCHEDULE, READINESS AND SUPPORTABILITY PARAMETERS

Lockheed
-Georgia Company

Conclusion

THE MILITARY-INDUSTRY TEAM WILL MEET THE
CHALLENGE TO PRODUCE WEAPON SYSTEMS WITH
THE REQUIRED READINESS AND SUPPORT CAPABILITIES

MARK PITTENGER
SR. MAINENANCE ENGINEER
BOEING AEROSPACE CO.

LOGISTICS RESEARCH AND DEVELOPMENT ACTIVITIES OF THE BOEING AEROSPACE COMPANY

CHART 1 - TITLE

Good afternoon. It is a pleasure to have this opportunity to review the logistics research and development activities of the Boeing Aerospace Company with you. At BAC, we are directing our logistics R&D efforts into three major areas.

CHART 2 - SUPPORT AND READINESS IMPROVEMENT AREAS

As the chart indicates, the three areas are: reduced support planning and development costs, reduced weapon system maintenance requirements and increased application of advanced technology to support activities. We believe that our efforts in each of these areas will result in improved weapon system support and readiness.

In our first major area of activity, we are working to reduce the cost of support planning and development activities. Reducing these costs will allow additional support planning to be performed during the "front-end" of programs and will assist in the containment of overall weapons system development costs.

CHART 3 - MINI COMPUTER PHOTO

The major tool that we have available to lower these costs is, of course, the computer. The recent explosive growth of mini and micro computer technology has provided us with the opportunity to incorporate computers into all aspects of logistics activities. Development of computer-aided

processes for logistics activities will allow us not only to lower costs, but also to do a better job. At BAC, we have termed our efforts to develop these capabilities as computer-aided logistics.

CHART 4 - COMPUTER-AIDED LOGISTICS

Our computer-aided logistics effort includes the development and implementation of three major functions. First, development of tools and systems for logistics functions. Second, development of easily accessed data bases of logistics information, and third, integration of our logistics and computer-aided design systems. Specific 1983 and 1984 projects include implementation of workstations for technical manual writers and illustrators, upgrade of our on-line Logistic Support Analysis Record system and development of workstations for logistics engineering personnel.

CHART 5 - ON-LINE FIELD EXPERIENCE DATA SYSTEM

A good example of the kind of things we are developing is our on-line field experience data system. When completed, this system will utilize a Hewlett-Packard HP-3000 mini computer to process Air Force 66-1 and Navy 3M field maintenance data. The processed data will then be stored on-line, where our personnel will be able to retrieve and manipulate it from terminals in their immediate work areas. Moving the processing of this data from its present batch mode environment to an on-line system will lower the processing costs and simultaneously make the data more usable to our anaiysts.

In our second major area of activity, we are looking for ways to reduce the maintenance requirements of weapon systems. Achieving reductions in maintenance requirements will improve support and readiness by increasing the availability of systems and lowering their support costs.

Some reduction of maintenance requirements is already coming about as a result of advancing technology. For example, the increasing use of Very Large Scale Integrated (VLSI) circuit technology has and will continue to increase the reliability of electronic equipment, resulting in fewer maintenance demands. Other reductions are going to require a little more effort on our part.

CHART 6 - SUPPORT COST VS PERIODIC TEST INTERVAL

One of our major projects in this area is directed at evaluating the effects of storage on weapon systems. A major maintenance requirement of tactical missile systems is periodic testing. All other factors being equal, a longer interval between periodic tests will result in lower support costs. The factor that generally establishes the periodic test interval is the estimated storage failure rate of the system. Increasing the interval between tests, therefore, requires that we understand the actual effects of storage and periodic testing on the system failure rate. In attempting to quantify these effects, we have pursued to avenues of investigation.

CHART 7 - RESULTS OF HISTORICAL DATA ANALYSIS

The first, was to analyze historical data from several missile systems in order to determine the effects of periodic testing on failure rates. The results of this effort indicated that, for a given system, an optimum periodic test interval exists and that more or less frequent testing only serves to increase the number of failures.

CHART 8 - RESULTS OF INTEGRATED CIRCUIT TESTING

The second avenue of investigation we pursued was to perform reliability testing on integrated circuits in an effort to determine the effects of long-term storage. The results indicated that the storage failure rate for these parts was essentially constant for lifetimes of up to 20 years. Since component aging does not appear to significantly increase the failure rate, all of the usual methods of increasing system reliability will also serve to increase storage reliability. Coupling this with an optimum periodic test interval will allow us to design systems that can be stored for long periods of time without unacceptable degradation of their operational availability.

The next steps in this effort will be to perform additional testing to verify our initial results, and to develop an analytical model that will allow us to optimize test intervals and perform sensitivity analyses.

Effort in our third major area of activity is directed at applying advanced technology to improving the support of weapon systems. Our activities in this area include the application of artificial intelligence to automated technical publications, development of computer based training equipment and development of techniques for measuring and maintaining EMP hardness.

CHART 9 - PUBLICATION DIFFICULTIES

Few subjects have had more discussion of late than the need to modernize our methods of preparing, distributing and using technical data. Our current systems present us with both cost and useability difficulties. In the cost area, acquisition costs and printing requirements are beginning

to exceed our ability to fund them. Typical acquisition costs for technical publications run from $1,200 to $1,500 per page. The Air Force printing requirements alone exceed two billion pages annually. In addition to the cost aspects, there are significant useability difficulties inherent in our present system. Close scrutiny reveals that present publications have limited usefulness as diagnostic aids, are relatively insensitive to the skill level of the using technician, and often encounter update delays of 6 to 9 months. Resolving these difficulties is going to require that we devise some better system.

CHART 10 - AUTOMATED TECHNICAL PUBLICATIONS USING ARTIFICIAL INTELLIGENCE (AI)
Our efforts in this area are currently focused on applying artificial intelligence to weapon system diagnostics. By some estimates, nearly 70% of all unscheduled maintenance manhours are consumed by diagnostics. Application of artificial intelligence is one possible way for us to make every maintenance technician an expert at diagnosing problems.

In our first year of effort in this area we have accomplished several things. First, we have surveyed the AI community in an effort to identify appropriate technology. Second, we have established an in-house AI capability to develop AI software. Anyone that has tried to locate a programmer that is experienced with the LISP language will understand how difficult this seemingly simple task can be. The first major product of this effort was a rule-based diagnostic system for a Hewlett-Packard printer. Evaluation revealed that while it was workable, a better approach would be to develop diagnostic systems that were knowledge based. All subsequent efforts have been directed at developing and proving the workability of a knowledge based system. So far, our results

have been quite encouraginq. Preliminary efforts have demonstrated the concept's validity, and we are proceeding with development of specifications for the full scale system.

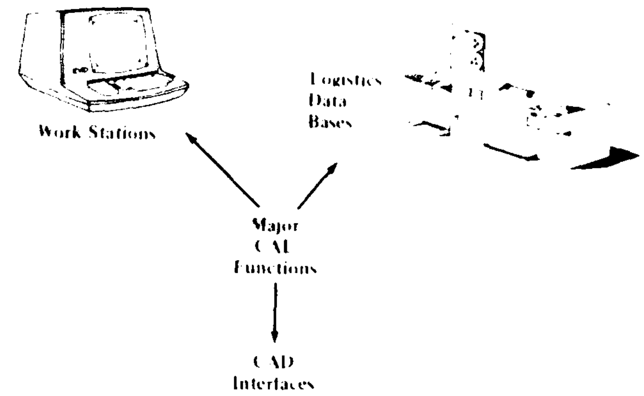
Our future plans for this effort include: development of the system software, development of complimentary system modules for training, data collection, data analysis and procedural presentation, and field demonstration of a procedural presentation system.

In conclusion, I would like to note that, while research and development efforts offer considerable potential for improvement of weapon system support and readiness, it is only through actual implementation that these improvements will be realized.

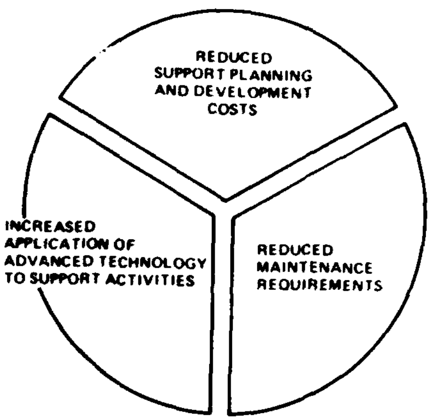
Logistics Research and Development Activities of the Boeing Aerospace Company

Mark E. Pittenger
Senior Maintenance Engineer

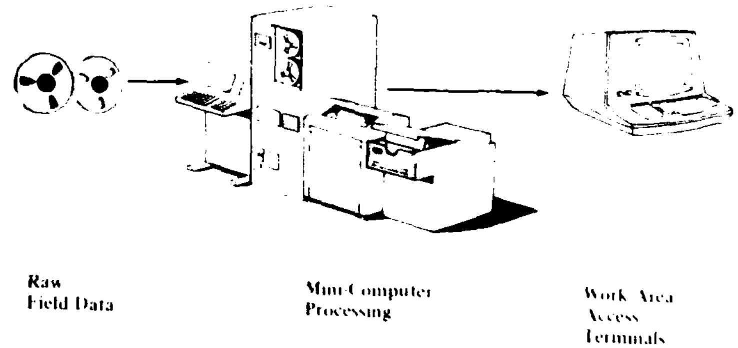
Computer — Aided Logistics



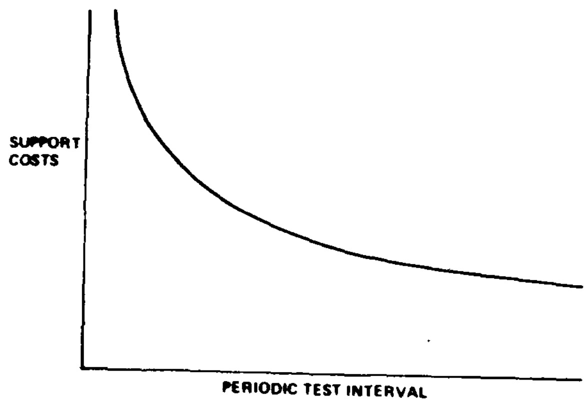
Support and Readiness Improvement Areas



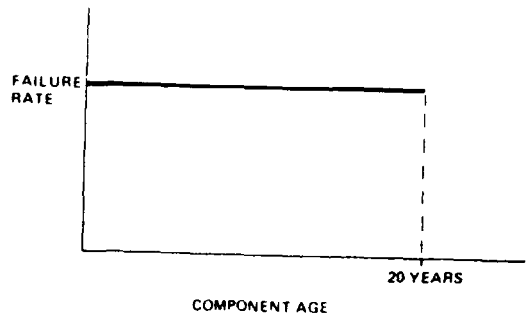
On-Line Field Experience Data System



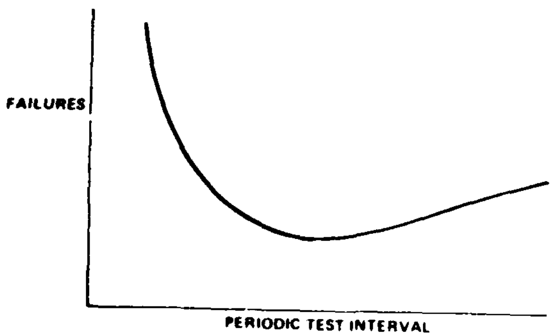
Support Cost vs. Periodic Test Interval



Results of Integrated Circuit Testing

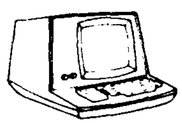


Results of Historical Data Analysis



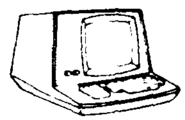
Automated Technical Publications Using Artificial Intelligence

1983

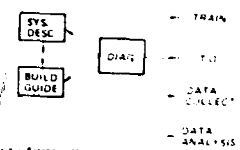


- Develop HPI expert sys
- Design multi domain sys
- Test and prove concept
- Obtain train personnel
- Survey AI community for like technology

1984



Increased Capability



- Develop system specs
- Develop basic software
- Demonstrate basic system
- Basic system modules
  - System description
  - Builders guide
  - Diagnostics

PRODUCT SUPPORT THE BOEING COMPANY

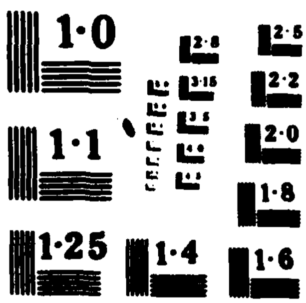
Technical Publication Difficulties

- Costs
  - Acquisition – \$1200 – \$1500 / page
  - Distribution – 2 billion pages annually test for A.F.
- Usability
  - Diagnostics – limited to tables and diagrams
  - Relative insensitivity to skill level
  - Update delays – 6-9 months common

Session V

AD A151 676   PROCEEDINGS OF THE INTEGRATED LOGISTICS SUPPORT SYMPOSIUM HELD AT FORT WO..(U) AMERICAN DEFENSE PREPAREDNESS ASSOCIATION ARLINGTON VA 02 DEC 83   2/4

UNCLASSIFIED   F/G 15/5   NL


1·0
1·1
1·25
1·4
1·6
1·8
2·0
2·2
2·5
2·8
3·15

EMERSON CALE
DIRECTOR FOR LOGISTICS PROGRAMS & ASSESSMENTS DIVISION
OFFICE OF CHIEF OF NAVAL MATERIAL

Navy Abstract of Session V

ILS FUNDING

The Navy's initiatives to deal with inadequate funding of logistic requirements is based on the recognition of several causes which must be addressed simultaneously. First the logistic side of the Navy historically has not been assertive in developing a systematic way to identify logistic requirements which could be input to the budgeting process. This allowed the possibility of budgets for Navy programs to be based on applied percentage factors for logistics, without any degree of consistent specificity, and without logistics personnel's direct involvement.

Secondly, the POM and budget structure that exists today tends to be organized in a manner of presentation that will reflect the interest of the Program Managers and budget analysts. Therefore, POM and budget presentation formats tend to reflect very limited visibility of dollars to specific logistics requirements. Navy Weapon System R&D and procurement appropriations today include logistic support in the aggregate only.

The Navy approach to improve visibility of funding for support is as follows:

(1) Develop a standard format to allow the build up of logistic requirement costs in a structure consistent with the logistic discipline and ILS elements planning process in the Navy. Established a minimum level of presentation that ensures the most important planning resource identification areas have been considered. Institutionalize the standard format requirement in policy, as a permanent part of ILS programs for all Navy acquisition programs.

(2) Develop a means of crossing logistic requirements to the budget process that will identify the specific appropriations to the minimum level presentation of the standard format. Institutionalize the basic building blocks of logistic elements into the requirements and policy for budget presentation.

The basic budget building blocks identification to logistic element requirements are as follows:

Logistic Element	Budget Identification
Maintenance	91X thru 919
Technical Data	92X thru 929
Supply/Pkg/Transportation	93X thru 939
Support and Test Equipment	94X thru 949
Computer Resources Support	95X thru 959
Facilities	96X thru 969
Training and Training Devices	97X thru 979
ILS Program Management	98X thru 989
Related Programs	99X thru 999

Applicable Appropriations

SCN	RDT&E
WPN	MILCON
APN	O&MN
OPN	STOCKFUND

The Navy plans to ensure implementation of the new procedures through review by the Logistic Review Group (LRG) at the Headquarters NAVMAT level; and assessment of ILS funding at the CNO level concurrent with the annual POM submission to the Navy comptroller.

Navy Abstract for Session II
Developments in Logistics Policy

"The primary objective of the ILS program shall be to achieve system readiness objectives at an affordable life cycle cost." This statement of DOD policy 5000.39 is the bottom-line basis, direction and focus for the services to test their policy and procedures for logistics support planning. The 1980 policy represented a significant step in DOD direction by specifying what needs to be done phase-by-phase in the weapon system acquisition process to meet the primary objective.

Within Navy there have been many policy and procedural changes which are related direction and indirectly to these same goals. In the area of establishing a quantitative link between readiness and support the Navy has defined that measure to be Operational Availability" (A_0). As a result of this A_0 starting point, secondary techniques are now evolving which are creating the methodologies of implementation. For example, the Navy is developing a handbook for warfare sponsors to assist them in defining readiness thresholds (A_0) in terms of an operational mission scenario. A "Availability Centered Inventory Model" (ACIM) is now being used to relate the level of investment in spares directly to a level of readiness.

To insure adequate levels of funding for support resources the Navy has developed and is experimenting with a standard Logistic Funding Plan format and a crossover set of standard building blocks to be used in budget and POM displays which will relate "requirements" in the plan to the specific appropriation in budgets.

For ensuring adequate implementation of logistic policy requirements the Navy uses the Logistic Review Group (LRG) process to review and "certify" the execution at each development milestone and at the point of introduction to fleet use. Additionally, the CNO has developed a "Baseline Assessment Memorandum" procedure which analyzes each Navy POM submission in terms of ILS requirements vs funding.

The Navy has recognized that adequate planning and execution of ILS for our weapon systems is dependent on a strong workforce of logistics expertise. A comprehensive ILS training curriculum has been developed for Navy and Marine Corp civilian and military personnel. The curriculum consists of separate module courses in all the ILS disciplines as well as analytical and management techniques i.e., LSA Critical Path Networking.

ILS FUNDING

NO SYSTEMATIC PLANNING PROCESS

PPBS SYSTEM REFLECTS INTEREST OF PM AND COMPTROLLER

NEED A SYSTEMATIC PROCESS

- IDENTIFY LOGISTICS REQUIREMENTS IN $
- MUST BE STARTED IN THE FIRST PROGRAM SUBMISSION
- MUST BE MAINTAINED THRU EXECUTION TO BE TRACKED
- A PROCESS MUST BE INSTITUTIONALIZED

ILS FUNDING OBJECTIVE

ENSURE LOGISTICS ACTIVITIES AND RESOURCE REQUIREMENTS ARE FUNDED TO SUPPORT WEAPON SYSTEMS AND READINESS OBJECTIVES

PREVENTING

- LATE IDENTIFICATION OF SUPPORT REQUIREMENTS WHICH PUTS PRESSURE ONPM'S BUDGET/ALLOCATIONOF AVAILABLE FUNDS TO SUPPORT
- BOW WAVING SUPPORT REQUIREMENTS
- TAKING PROGRAM CUTS DISPROPORTIONATELY IN SUPPORT AREAS

ILS FUNDING PLAN

STANDARD FORMAT

ILS ELEMENT				CURRENT YEAR		BUDGET YEAR		POM YEARS	
MAINTENANCE				REQ'D		REQ'D		REQ'D	
TECHNICAL DATA									
SUPPLY									
TEST EQUIPMENT									
FACILITIES									

BUILDING BLOCKS

LOGISTIC FUNDING PLAN ELEMENT	BUDGET IDENTIFICATION
MAINTENANCE	91X THRU 919
TECHNICAL DATA	92X THRU 929
SUPPLY/PKG/TRANSPORTATION	93X THRU 939
SUPPORT AND TEST EQUIPMENT	94X THRU 949
COMPUTER RESOURCES SUPPORT	95X THRU 959
FACILITIES	96X THRU 969
TRAINING AND TRAINING DEVICES	97X THRU 979
ILS PROGRAM MANAGEMENT	98X THRU 989
RELATED PROGRAMS	99X THRU 999

CURRENT STATUS

44 NAVY PROGRAMS IN POM 86 SUBMIT

CNO BASELINE ASSESSMENT MEMORANDUM

NAVMAT POLICY DIRECTIVE DRAFT

SUPPLY PACKAGE TRANSPORTATION

PLANNED NUMBER OF UNITS TO BE PROCURED EACH YEAR

PAGE 3

LOGISTICS ELEMENT	PROJ UNIT	APPN	PROGRAM IDENTIFICATION	CC / BS	CURRENT YEAR REQ'D FUND	BUDGET YEAR REQ'D FUND	PROGRAM YEAR REQ'D FUND	FY REQ'D FUND	FY REQ'D FUND
3.0 Supply PKG Transp	93X								
3.1 Spare and Repair Parts									
3.1.1 Development Test	930								
3.1.2 Interim Initial Operation	931								
3.1.3 Maint. Asst Modules (MAMs)	932								
3.1.4 Train. System Device									
3.1.5 Peculiar Support Equipment	934								
3.1.6 Repair parts	935								
3.1.7 Follow-on Outfitting	936								
3.2 Plans Analysis Data	937								
3.3 Pkg/Handling/Storage, Transportation									
3.3.1 Containers Spec Pkg	938								
3.3.2 Plans, Analysis Data	939								

LONGER THAN SHOWN

TRAINING AND TRAINING DEVICE

PLANNED NUMBER OF UNITS TO BE PROCURED EACH YEAR

PAGE 7

LOGISTICS ELEMENT	PROJ UNIT	APPN	PROGRAM IDENTIFICATION	CC / BS	CURRENT YEAR REQ'D FUND	BUDGET YEAR REQ'D FUND	PROGRAM YEAR REQ'D FUND	FY REQ'D FUND	FY REQ'D FUND
Training and Training Device	97X								
7.1 Training									
7.1.1 Training Courses	971								
7.1.2 Factory or Contractor Training	972								
7.2 Training Equipment									
7.2.1 Tech. Train Equip. (TTE)	973								
7.2.2 Training Devices Aids	974								
7.3 Anal. Studies, Plans Data	975								

LONGER THAN SHOWN

COL [illegible] RICHARD [illegible]
DEPUTY DIRECTOR FOR FORCE MODERNIZATION [illegible]
HQ DARCOM

BACKGROUND INFORMATION

• CG DARCOM APPROVED ILS STUDY RECOMMENDATIONS	29 SEP 82
• STUDY RECOMMENDED VISIBILITY AND CONTROL FOR ILS FUNDS	—
• CG DIRECTION TO FENCE ILS FUNDS	3 NOV 82
• SIX STAR LETTER "ILS PROGRAM RESPONSIBILITIES" (INCL FUNDING VISIBILITY)	5 JAN 83

CHART 1 ON (BACKGROUND INFORMATION)

THE DARCOM DEPUTY COMMANDING GENERAL FOR MATERIEL READINESS DIRECTED, ON 27 MAY 82, THAT. A DETAIL EXAMINATION OF THE CURRENT INTEGRATED LOGISTICS SUPPORT (ILS) SYSTEM BE PERFORMED AND RECOMMENDATIONS BE PROVIDED TO IMPROVE THE PROGRAM. THE RESULTS OF THE STUDY WERE BRIEFED TO-AND-APPROVED BY THE COMMANDING GENERAL, DARCOM ON 29 SEP 82. THE ILS STUDY RECOMMENDED EFFORTS BE DIRECTED TO IMPROVE VISIBILITY AND CONTROL OF ILS FUNDS. IN NOV 82, THE COMMANDING GENERAL, DARCOM PROVIDED DIRECTION TO FENCE ILS FUNDS. THE DARCOM DIRECTOR OF SUPPLY, MAINTENANCE, AND TRANSPORTATION (SMT) WAS TASKED TO IMPLEMENT THE ILS STUDY INITIATIVES. IN SUPPORT OF THIS STUDY, ON 5 JAN 83 LTG BABERS, DEPUTY COMMANDING GENERAL FOR MATERIEL READINESS, AND LTG LUNN, DEPUTY COMMANDING GENERAL

CHART 1 CONTINUED

CHART 1 CONTINUED

FOR RESEARCH, DEVELOPMENT, AND ACQUISITION, FORWARDED A LETTER TO DARCOM MAJOR SUBORDINATE COMMANDS (MSC) PROVIDING GUIDANCE ON ILS PROGRAM RESPONSIBILITIES AND INSTRUCTIONS TO ESTABLISH AND COORDINATE TOTAL ILS FUNDING REQUIREMENTS IN ADDITION TO MAINTAINING VISIBILITY OF THE FUNDING STATUS.

CHART 1 OFF

DIRECTIONS ON ILS FUNDING

- VISIBILITY AND CONTROL OF REQUIREMENTS AND RESOURCES
- DIRECTION TO CONTROL AND FENCE ILS FUNDS
- FENCE ILS FUNDS AT DARCOM LEVEL IN PROGRAM MANAGEMENT CONTROL SYSTEM (PMCS)

CHART 2 ON (DIRECTIONS ON ILS FUNDING)

THE DARCOM SUPPLY, MAINTENANCE, AND TRANSPORTAITON DIRECTORATE INITIATED AN ILS FUNDING EFFORT TO PROVIDE MANAGEMENT CONTROL AND VISIBILITY OF LOGISTIC SUPPORT REQUIREMENTS AND RESOURCES. THIS EFFORT WAS IN RESPONSE TO THE DARCOM COMMANDING GENERAL'S APPROVAL OF THE ILS STUDY AND DIRECTION TO CONTROL AND FENCE ILS FUNDS FOR LOGISTICS SUPPORTABILITY OF WEAPON SYSTEMS. THE CG DARCOM DIRECTED THAT THE ILS FUNDS BE FENCED AT THE DARCOM LEVEL IN PMCS IN LIEU OF THE DEPARTMENT OF ARMY LEVEL.

CHART 2 OFF

PMCS

- CONTRACT BETWEEN CG DARCOM AND PMs
- ASSURES SUPPORTABILITY CONSIDERATIONS EQUAL TO HARDWARE DEVELOPMENT
- ILS FUNDS CANNOT BE USED FOR OTHER PURPOSES

CHART 3 ON (PMCS)

PMCS IS CONSIDERED A CONTRACT BETWEEN THE CG DARCOM AND HIS PROJECT MANAGERS (PM) AND WILL ASSURE THAT SUPPORTABILITY CONSDIERATIONS ARE EQUAL TO HARDWARE DEVELOPMENT. THE PMs/MSCs CANNOT USE THE ILS FUNDS FOR ANY OTHER PURPOSE WITHOUT PRIOR APPROVAL FROM HQ, DARCOM. DECISIONS TO TRANSFER ILS FUNDS WILL REQUIRE A MANAGEMENT DECISION, STAFFED THROUGH PROPER CHANNELS TO HQ, DARCOM TO CONSIDER RISKS AND ALTERNATIVES.

CHART 3 OFF

FUNDING VISIBILITY AND CONTROL

DARCOM-C 11-1 (PMCS)

- ILS MANAGEMENT CODE
- DISTRIBUTION OF ILS FUNDS
- ILS FUNDING REPORT
- TOTAL ILS FUNDS (BY APPROPRIATION AND AMS CODE)

CHART 4 ON (FUNDING VISIBILITY AND CONTROL)

FUNDING VISIBILITY AND CONTROL WILL BE PROVIDED BY FENCING ILS FUNDS IN THE PROGRAM MANAGEMENT CONTROL SYSTEM (PMCS) THROUGH DARCOM CIRCULAR 11-1. FENCING OF ILS FUNDS WILL BE IMPLEMENTED BY ASSIGNING A "77" ILS MANAGEMENT CODE IN POSITIONS 12 AND 13 OF THE RESEARCH, DEVELOPMENT, TEST, AND EVALUATION (RDTE) ARMY MANAGEMENT STRUCTURE (AMS) CODE FOR EACH WEAPON SYSTEM IN PMCS. THIS WILL ALLOW DARCOM TO DISTRIBUTE ILS FUNDS BY WEAPON SYSTEM TO THE PROJECT MANAGERS (PM). DARCOM CIRCULAR 11-1 WILL ALSO REQUIRE THE PROJECT MANAGER TO SUBMIT AN ANNUAL ILS FUNDING REPORT TO HQ, DARCOM. THE ANNUAL ILS FUNDING REPORT WILL IDENTIFY THE TOTAL ILS FUNDS REQUIRED FOR A WEAPON SYSTEM BY APPROPRIATION AND ARMY MANAGEMENT STRUCTURE (AMS) CODE. THE ANNUAL ILS FUNDING REPORT SUBMITTED, WILL BE BASED UPON THE ILS FUNDING FRAMEWORK AND STRUCTURE DEFINED IN DARCOM REGULATION 700-26, FUNDING FOR ILS.

CHART 4 OFF

FUNDING FOR INTEGRATED LOGISTICS SUPPORT

DARCOM-R 700-26

CONTAINS

- ILS FUNDING FRAMEWORK AND STRUCTURE
- ILS FUNDING DEFINITIONS
- ILS BUDGET WORKSHEETS

CHART 5 ON (DARCOM-R 700-26)

DARCOM REGULATION 700-26 PROVIDES A DARCOM OFFICIAL FRAMEWORK AND STRUCTURE FOR VISIBILITY AND CONTROL OF ILS FUNDS DURING THE PLANNING, PROGRAMMING, BUDGETING, AND ACCOUNTING PROCESS. ILS FUNDING DEFINITIONS ARE PROVIDED WITH THE FRAMEWORK AND STRUCTURE TO DEFINE SPECIFIC TASK INPUTS FOR THE ILS BUDGET WORKSHEETS IN THE CONCEPT, DEMONSTRATION AND VALIDATION (DVAL), FULL SCALE DEVELOPMENT (FSD), AND PRODUCTIONS AND DEPLOYMENT PHASES OF THE SYSTEM LIFE CYCLE.

CHART 5 OFF

ILS FRAMEWORK AND STRUCTURE
(FSD PHASE)

MULTIPLE LAUNCH ROCKET SYSTEM PROGRAM ELEMENT 644314

MLRS	HQ, DA LEVEL PE 644314.564
MLRS	HQ, DA WITH ILS PE 644314.5640077

ILS MANAGEMENT EFFORT

- TASK 1 ILS PROGRAM PLANNING RDTE
- TASK 3 LOGISTICS SUPPORT ANALYSIS PLAN RDTE
- TASK 10 MATERIEL FIELDING PLAN RDTE
- TASK 23 DEPOT MAINTENANCE SUPPORT PLAN RDTE

ILS DEVELOPMENT / ACQUISITION

ELEMENT 1 MAINTENANCE SUPPORT DEVELOPMENT

- TASK 1 SUPPORTABILITY TEST AND EVALUATION RDTE
- TASK 2 MAINTENANCE ALLOCATION CHARTS RDTE
- TASK 3 LOGISTICS DEMONSTRATION RDTE

ELEMENT 2 MANPOWER AND PERSONNEL RDTE

ILS FRAMEWORK AND STRUCTURE
(FSD PHASE) (CONT'D)

ELEMENT 3 SUPPLY SUPPORT

TASK 1 PROVISIONING	RDTE 644314.5640077
TASK 2 SPARES AND REPAIR PARTS PROC, ARMY 2400.000	

ELEMENT 4 SUPPORT EQUIPMENT & TMDE

TASK 1 TPS DEVELOPMENT	RDTE
TASK 2 PROCUREMENT LONG LEAD TIME ITEMS PROC, ARMY 2511.000	

ELEMENT 5 TRAINING AND TRAINING DEVICES

TASK 1 ENGINEER & SERVICE TEST PERSONNEL DT/OT TRAINING & STAFF PLANNERS TRAINING	RDTE
TASK 2 NEW EQUIPMENT TNG-CONTRACTOR FACILITY	OMA 738017.F00S1
TASK 2 NET-CONTRACTOR - GOVT FACILITY OMA 738017.F00S2	

[illegible] FRAMEWORK AND [illegible]

THE [illegible] FUNDING STRUCTURE HORIZONTALLY [illegible] RDTE, [illegible] MA[illegible] FUNDS AND MILITARY CONSTRUCTION APPROPRIATIONS [illegible] FUNDS REQUIRED TO PERFORM CONTRACTOR EFFORT, GOVERNMENT IN-HOUSE EFFORT, AND PROCUREMENT OF SUPPORT REQUIREMENTS. WITHIN THE ILS FUNDING STRUCTURE, THE TOTAL FUNDS REQUIRED FOR A WEAPON SYSTEM ARE DIVIDED INTO TWO SEGMENTS, ILS MANAGEMENT FUNDS AND ILS DEVELOPMENT/ACQUISITION FUNDS. ILS MANAGEMENT FUNDS ARE THOSE FUNDS REQUIRED FOR THE EFFORT TO PLAN, ANALYZE, AND MANAGE THE DEVELOPMENT AND ACQUISITION OF LOGISTIC SUPPORT RESOURCES. ILS DEVELOPMENT/ACQUISITION FUNDS ARE THOSE FUNDS REQUIRED FOR THE EFFORT TO DEVELOP AND PROCURE THE LOGISTIC SUPPORT RESOURCES.

CHART [illegible] OFF

ILS FUNDING DEFINITIONS

- TASK FUNDING LEVEL
- ELEMENTS FUNDING LEVEL
- SEGMENT FUNDING LEVEL

CHART 7 ON (ILS FUNDING DEFINITIONS)

ILS FUNDING DEFINITIONS HAVE BEEN DEVELOPED FOR THE TASK, ELEMENT, AND SEGMENT FUNDING LEVELS OF THE ILS FRAMEWORK AND STRUCTURE FOR THE PM TO IDENTIFY EFFORT AND FUNDS. THESE DEFINITIONS ARE ALSO IDENTIFIED BY APPROPRIATIONS AND APPLICABLE AMS CODES.

CHART 7 OFF

ILS BUDGET WORKSHEETS PM/MSC

PHASE ______________

TOTAL SYSTEM ILS FUNDS

BY APPROPRIATION
BY ARMY MANAGEMENT STRUCTURE (AMS) CODE

ILS MANAGEMENT FUNDS	ILS DEVELOPMENT/ACQUISITION FUNDS
BY APPROPRIATION	BY APPROPRIATION
BY AMS CODE	BY AMS CODE
BY TASK	BY ELEMENT
	BY TASK

CHART 8 ON (ILS BUDGET WORKSHEETS PM/MSC)

THIS SLIDE SHOWS THE TYPE OF INFORMATION PROVIDED BY THE ILS BUDGET WORKSHEETS FOUND IN DARCOM-R 700-26. THE WORKSHEETS ARE USED BY THE PROJECT MANAGER TO PLAN, PROGRAM, AND BUDGET FOR THE RESOURCES REQUIRED TO PERFORM THE ILS EFFORT. THIS IS ACCOMPLISHED BY IDENTIFYING EACH ILS TASK REQUIRED, THE EFFORT PROCUREMENT REQUIRED TO ACCOMPLISH THE TASK, AND THE FUNDS REQUIRED. THE FORMAT OF THE ILS BUDGET WORKSHEETS ARE PROVIDED AS A GUIDE AND CAN BE TAILORED SINCE ILS TASKS AND CONTRACT DATA REQUIREMENTS VARY DEPENDING ON WEAPON SYSTEM REQUIREMENTS. GUIDANCE IN PREPARATION OF THE ILS BUDGET WORKSHEETS IS CONTAINED IN DARCOM-R 700-26. THE ILS BUDGET WORKSHEETS ARE RETAINED BY THE PM AS BACKUP INFORMATION AND ARE NOT PROVIDED TO DARCOM.

CHART 8 OFF

ILS BUDGET WORKSHEET

PMCS ANNUAL ILS FUNDING REPORT TO DARCOM

TOTAL SYSTEM ILS FUNDS

BY APPROPRIATION
BY AMS CODE

CHART 9 ON (PMCS ILS FUND REPORT)

THE PM/MSC WILL UTILIZE DATA IN PM/MSC BUDGET WORKSHEETS TO DEVELOP THE PMCS ANNUAL ILS FUNDING REPORT TO HQ, DARCOM. THE PMCS ANNUAL ILS FUNDING REPORT TO HQ, DARCOM WILL PROVIDE THE INFORMATION SHOWN ON THIS SLIDE. THE INFORMATION WILL BE PROVIDED IN ACCORDANCE WITH DARCOM CIRCULAR [illegible] AND THE FORMATS OUTLINED IN SECTIONS III OF APPENDICES E, F, G, OR H OF DARCOM REGULATION 700-26 FOR THE CONCEPT, DVAL, FSD, AND PRODUCTION AND DEPLOYMENT PHASES RESPECTIVELY.

CHART 9 OFF

ILS STATEMENTS OF WORK

DARCOM-P 700-21

CONTAINS

- ILS STATEMENTS OF WORK
- INTERFACES WITH DARCOM-R 700-26
- INTERFACES WITH WORK BREAKDOWN STRUCTURE (WBS)

CHART 10 ON (STATEMENTS OF WORK)

EXAMPLE STATEMENTS OF WORK (SOW) ARE PROVIDED IN DARCOM PAMPHLET 700-21 FOR THE CONCEPT, DVAL, FSD, AND PRODUCTION AND DEPLOYMENT PHASES OF THE SYSTEM LIFE CYCLE. THE SOWS INTERFACE WITH THE FRAMEWORK (STRUCTURE, DEFINITIONS) AND BUDGET FUNDING WORKSHEETS IN DARCOM REGULATION 700-26, FUNDING FOR ILS. THE STATEMENTS OF WORK REQUIRE THE CONTRACT WORK BREAKDOWN STRUCTURE (WBS) FOR ILS TO BE STRUCTURED IN THE SAME FORMAT AS THE ILS FUNDING STRUCTURE. ILS ELEMENTS AND ILS MANAGEMENT EFFORTS ARE DEFINED AT LEVEL [illegible] IN THE WBS AND COST PERFORMANCE REPORTING WILL BE AT THE TASK LEVEL, WHICH IS LEVEL [illegible] IN THE WBS. THE EXAMPLE STATEMENTS OF WORK ARE PROVIDED AS A GENERAL GUIDE FOR CONTRACT STANDARD WORDING; HOWEVER, THE [illegible] WORDING MAY BE TAILORED TO APPLY TO [illegible] SYSTEM REQUIREMENT.

CHART [illegible]

CURRENT STATUS

- DARCOM-R 700-26 CURRENTLY BEING STAFFED AT HQ, DARCOM
- DARCOM-P 700-21 BEING SUBMITTED FOR PUBLICATION
- CHANGE TO DARCOM-C 11-1 SUBMITTED TO PROPONENT (DRCDE) FOR IMPLEMENTATION (16 NOV 83)

Session VI

WHAT DOES THE CONTRACT SAY?

I L S

PROCESS ?

RESULT ?

THE ILS PROCESS ASSURES THAT

LOGISTIC SUPPORT RESOURCES ARE:

- o DEVELOPED
- o ACQUIRED
- o TESTED
- o DEPLOYED

AS INTEGRAL PART OF MATERIEL ACQUISITION PROCESS

THE ILS RESULT IS

LOGISTIC SUPPORTABILITY:

A DESIGN PARAMETER

OF EQUAL

IMPORTANCE

WITH

COST

AND

TECHNICAL PERFORMANCE

LOGISTICS SUPPORT ANALYSIS (LSA)

PRIMARY TOOL OF ILS

LSA

ANALYTICAL EFFORTS APPLIED TO ARRIVE
AT THE LOGISTICS SUPPORT REQUIRED

LOGISTIC SUPPORT ANALYSIS RECORD (LSAR)

DOCUMENTS LSA

Lawrence R. Hawkins
Operations Manager, Defense Products
EATON CORPORATION

ABSTAINER

This paper represents the views of the author and does not necessarily reflect the official opinion or views of the United States Army or of the EATON CORPORATION.

ABSTRACT

Over the past decade the field of logistics has undergone significant change in both direction and implementation. In particular, Military Department system and program managers at all levels have begun to recognize the significance of initiating logistic requirements into acquisition planning early on. The degree of logistic success in any given program by any given contractor(s) is directly relateable to the manner in which logistic requirements are stated in the contract. This paper addresses the utilization and interrelationships of those documents [Statement of Work (SOW), Data Item Description (DID) and Contract Data Requirements List (CDRL)] which are an integral, if not the key, part of this process.

INTRODUCTION

Over the years there has been a lot of history written about the role of logistics and the professional logisticians in the government acquisition process. We all know of the thankless moments, frustrations and sometimes down-right refusals by system managers to integrate crucial ILS support into their systems. Recently it was stated that upwards of 70% of any system being acquired is ILS oriented. This only makes the logisticians role all the more important today; and unfortunately, that role is evolving in change, we all see these changes occuring in varying degrees from our place in the pecking order.

DoD has recognized the ILS role and published DODD 5000.1 & 5000.39, both of which give needed direction as to the importance and priority of ILS. Service publications such as MIL-STD 1388lA and 2A (soon to be published) and DARCOM PAM 700-21 also reinforce this effort. Your attendance at this program is yet further evidence of support.

But getting to the bottom line, what are we inferring and where does it come home to us as logisticians. I submit to you that it is in logistic planning. Messrs. Crounch and Link from Kenton Inc. stated it well. I quote "Logistic planning

represents a major link in the accomplishment of force development and deployment. It is not a functional element to be considered as an afterthought, but a foundation of the weapon system development process. When logistic considerations are excluded from the weapon system development process or included too late to be of significant benefit, the inevitable result is a weapon system or equipment item that is inadequately supported. With inadequate support, the system cannot perform its assigned mission. Whether logistics supports wartime plans or weapon system design, its involvement in the development process is critical to the overall success of any mission" unquote.

Having said this however, logisticians in their planning are still finding it difficult to justify their requirements in the system development process. Additional curtailment appears to stem from the voluminous amount of paperwork we have to deal with, conflicting or out of date regulatory guidance to be followed and the waivering structured approach used to delineate logistic requirements.

HQ DARCOM also recognized the problem and in 1982 directed a complete review of the ILS effort. Their objective was to review ILS philosophy and implementation in the acquisition of required weapon systems. They concluded that specification development (logistic planning) was plagued with such things as redundancy, contradiction, timeliness, inconsistency and inappropriate application. DARCOM also saw the huge payoffs which could be achieved if these problems were reduced and/or preferably, eliminated. As could be expected the emphasis went to this problem, and as a result, many changes were recommended in terms of policy and direction, specification development, integration of logistic requirements, and revision of those key documents which carried the burden of logistic identification in any contract. It's in this area that I would like to focus the remainder of my discussion. The aforementioned documents are the SOW, CDRL and the DID.

BODY

Before elaborating on those logistic planning documents, I would like to briefly reflect on their definitions (DARCOM PAM 700-21).

SOW -- Although varying widely in precise definition, the term generally covers that portion of the contract that describes the actual work to be done by means of specifications or other minimum requirements, quantities, performance dates, and a statement of the requisite quality.

CDRL -- The DD Form 1423, which provides a consolidated listing of all deliverable data, when and how it is to be delivered and a means of obtaining estimated costs.

DID -- The DD Form 1664 describes the data to be delivered. This description includes title, identification number, description/purpose, approval application/interrelationship, references, and preparation instructions for the data.

As you might of noticed, the definitions themselves smack somewhat of redundancy, especially between the SOW and DID. As a side comment, since each of these when executed in a specification or contract has a remarks or technical section, it leaves open yet another possiblilty for inconsistency, in that inevitably the writers judgement then su[illegible]ces. If not well controlled through the review process th[illegible] written "judgement calls" as to interpretation of the actual requirements will in themselves introduce or reintroduce many of the problems mentioned earlier. I am not saying eliminate these sections, because if they are properly used, they become valuable explanatory tools to the contractor for logistic requirement definition. The integrity of the requirement must at all costs be maintained.

Up to this point the discussion has been rather generic in nature. Now let me review and offer specific comments about these solicitation documents. In most every case, the logistician involved with his requirements is seeking one thing . . . . data. Data is primarily the medium by which most acquisition related decisions are made. Only in the introduction of prototypes, experimental hardware, breadboard mockups, ect., in the early stages of system procurement can data be related to something a person can touch or relate to actual hardware. Otherwise, the bulk of it is paperwork in one form or another. SOW's and DIDs provide the means to obtain data, as required by the CDRL.

In paragraph 4-105 of the DAR, Statement of Work, we're reminded of the essentiality of good SOW preparation in sound contracting. It's imperative that we understand, accept and utilize this direction in specification development. Unfortunately, we are not all in the same shoe! Research of past and existing contracts reflect much disparity in understanding and implementation. To further complicate the problem, the relationships between applicable DIDs and CDRLs are not always clearly defined. For Example, a 1969 DID requiring GSERD data was inserted into a RFP. When a bidder questioned the validity of this requirement the RFP was immediately amended to include DI-S-3596(A) (Feb. '77). This DID is also, for all intended purposes, obsolete. In fact, there no longer is a specific DID for either GSERD or SERD data and all data is now input to the system by MIL STD 1388 1A/2. Just a hickup, but confusion and loss of valuable time on both sides of the fence resulted.

If you have a joint service acquisition, the problem becomes even cloudier as terminology changes, unique service

requirements have to be addressed and the review and edit process is lengthened. For example, a Navy SOW still uses the term "perform a limited ISAR. No LSAR data sheets are required and no LSAR will be delivered", but the CDRL for this requirement cited the LSAR DID. Another example specifies compliance with a particular DID in the CLIN, but the remarks section of the CDRL is so written that the DID is modified.

Another observation: When looking at the aforementioned contracts, many of the SOWs reviewed were written with such detail that it inadvertantly overrode or contradicted the DID(s), and in some cases, even negated the remarks found in the CDRL. Another problem noted was when the logistic requirements were not well tailored or coordinated and resulted in conflict between the logistic and other segments of the contract. Conversely, you occasionally saw requirements so vaguely written that the real desired logistic message was never perceived by the contractor.

My research also identified selected DIDs who are more subject to misinterpretation than others. For those that apply to numerous or all the ILS elements, the risk of conflict between applicable SOW, DID and/or CDRL is more likely to occur. For example, report requiring DIDs such as DI-A-1005 and DI-S-4057; the basic ISP DID, #DI-S-6138; and the LSAR data DID, #DI-S-6171 all fall within this category. Basically, there are more "players" in the solicitation game in such cases the risk of duplication and inconsistency increases. Still another aspect of the problem is where a particular ILS element has a significant number of DIDs relating to the CDRL. For example, supply support has at least 15 related DIDs (DARCOM PAM 700-21). In this case, the SOW writer(s) must be extremely careful or else the resulting statements can easily become intertwined and misconstrued. Further, the introduction of more than one writer into the SOW delineation process can tend to complicate the situation. Regardless, both areas need more emphasis -- especially during the inhouse review periods.

I believe a comment about solicitation document tailoring is warranted. In my opinion, tailoring is the execution of selected actions to perfectly (or as near as possible) fit the requirements document to a condition, preference, or purpose. It implies withdrawal of unneeded tasks or statements thereby leaving only what's essential. A term that many misuse when they discuss tailoring, is modification. Again, in my opinion, modification is the alteration, adjustment or limiting of requirements wording by rewriting or adding something to that which already exists. I submit to you that specification writers do more of the latter when they should be doing more of the former.

A few additional thoughts before I close. Although both the Military Department and the contractor have to be responsive to

changes, the less changes introduced mean higher payoffs later on. Unfortunately, the Service's track record indicates a world of change. Those that are introduced because of funding change or system procurement priority change normally create problems but can be lived with. The real issue is those changes which come as a result of poor logistic requirements definition or poor logistic specification development. In neither case can the the contractor expect anything but trouble in understanding what's expected of him.

In conjunction with my last statement I s ıld like to add this. Where procedures are developed within the SOW to ensure current design configuration data is distributed to respective ILS element activities, a better check and balance system must also be identified to prohibit duplication, loss of time and inconsistency of the ILS data. This requires a bit more verbage and coordination, but basically the impact on the contractor is significant if corrective changes are made and not brought to his attention immediately. He must fully understand the parameters and decision points in and under which he can freely operate. Of course, the same caution applies to the specification writers and ILS activities involved.

I'm sure the question can be asked, "Just how far can the solicitation document process be standardized?" The new DARCOM PAM 700-21 and MIL Handbook 245 both go a long way in this direction. It's evident that much work has been done toward elimination of the problems we've discussed in the last few minutes and the effort will add improvement to the acquisition process. To this end I would bring up one caution statement -- standardization must never go to the point where the objective judgement of the logistician is replaced by a regimented format, outline or procedure. In our attempts to improve the system lets never forget that premise.

CLOSING

To close let me mention these thoughts:

First, in spite of much work in recent months we still are behind the power curve when it comes to accurately portraying the logistic requirement in terms of a SOW, DID or CDRL. For example, the DARCOM ILS study recommended 4 DIDs for revision and 3 new ones to be published. Today, almost 18 months later, only one of the revisions is near completion and none of the new ones are drafted. DID development/revision/or elimination must keep pace with system/preparation technology.

Secondly, I believe the myriad of refere.ce material currently available from DOD , the various military departments and major and subordinate Command Headquarters is too prolific. Logisticians cannot keep it current, do their job, and at the same time react to the evolving logistic technologies. In this sense, standardize and reduce them wherever possible.

Third, specification writers must eliminate "over the shoulder" type of requirements delineation. Be precise, say what you mean and tell industry exactly what's required. More is not always better!

Fourth, the process of tailoring and modifying solicitation documents requires greater discussion and understanding by specification writers.

Fifth, the updating process to revise and validate any logistic solicitation documents is too long. It appears that the decentralization of required tasks does not permit drafting, revision, coordination and approval in a timely manner. With an estimated 70 plus DIDs driving the current LSAR process, a myriad of regulation and policy documentation available from all sectors of the military community, and the continually evolving logistic technology, the task(s) becomes impossible under the present methodology.

Last and most important, it's imperative that when the specification writer defines his logistic requirements, i.e. SOW, DID, CDRL, that there is a cohesive relationship between them, to include the applicable SOURCE DOCUMENT(S) (MIL STD, ETC.). No longer can we live with disjointed requirements. The utiles of such an exercise in terms of resources (men, money, and material) is negative for both the goverment and contractor alike.

RECOMMENDATIONS

My recommendations are these __________

- Reduce the number of DIDs.
- Give greater authority and responsibility to the ILS manager.
- Consider greater use of automation
  - -Logistician spec writer can tailor
  - -Eliminate confusion
  - -Standardize
  - -Eliminate duplication between logistic segments and other segments of the solicitation documentation.
- Look at ways to shorten revision/update procedures .
- Include logistic annotated requirements in draft specifications or market surveys released to industry prior to award.

Pay me now or pay me later ---; for if we do it right upfront, then the implementation arena will not be one of confusion and change.

- -

The author wishes to thank the many people, both industry and military, who contributed to this paper's content. It's dedication like yours that will make the acquisition system work despite the various deficiencies that exist.

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BOB SMITH
BELL HELICOPTER TEXTRON

CONTRACTING "PROBLEMS"

All of us here are involved in the acquisition process in some manner, and we all recognize that to reduce program start-up leadtimes many programs are started, or are in the solicitation/proposal stage of the acquisition process long before applicable developmental programs are completed and ILS considerations evaluated by both the Government and the Contractor.

Such programs place an almost singular emphasis on the end product. In the past, little or no emphasis has been placed on the support aspects of the program, i.e. supportability, provisioning, manuals, special test equipment, ground support equipment, training and spare parts support. This lack of emphasis is more often than not sourced in the lack of dollars to procure support, for a multitude of reasons, thereby jeopardizing the entire program at the time of fielding.

One solution to such problems is to recognize supportability as a key element in the acquisition process necessary to assure effective and economical support of an end product, both before and after fielding is accomplished.

ILS should be utilized in all materiel acquisition programs from the very start of the program. Detailed requirements for ILS should be used in all work statements included in solicitation documents; data item descriptions (DID) and Contract Data Requirements Lists (CDRLs) should parallel or correlate all detailed requirements for ILS.

Supportability should then be tailored into the requirements and specifications covering a specific program; and should then influence the design of the end product, whether that influence be toward more efficient maintainability of an end product and/or its components in the field or second, toward purely economical aspects by substitution of less costly alternative components or third, by substitution of components based on life cycle cost factors.
Possibly the single most significant problem with contracting for ILS is the fact that we do not have a single customer with a finite set of requirements, but in lieu thereof, each branch of the Armed Services takes different paths to achieve a similar goal.

Yesterday, General Thompson noted a lack of Program Managers and Contracting Officers in attendance. It is imperative that these people have a full grasp of what ILS is, what it takes to implement it, and how to go about contracting for it.

We have several contracts at Bell, such as AHIP for the Army and JVX for the Navy/Air Force, that address ILS considerations up-front with engineering design. However, the requirements for ILS, which in principle are toward the same end, differ dramatically.

Another problem which has come to the forefront recently is the requirement by the Customer for firm fixed pricing negotiated prior to contract award, versus cost type or firm price incentive contracts. Firm pricing is a risk both for the Government and the Contractor since the end product is still in a design development stage, thereby making it most difficult to address all aspects of

ILS, yet we must price as if all considerations were fully defined. This type contracting causes the following actions to take place:

- Locks the Government and Contractor into initial interpretations of specification requirements. This opens the door to the fact that any reinterpretations of specifications, new specifications, or just plain "better ways" to do things can be changes of scope adding additional contract time to a program with a fixed end date.

- It is difficult to estimate the amount of effort required due to proposal leadtimes and the lack of engineering definition at proposal submittal and during the negotiations.

- System tests can result in major redesign of systems/subsystems. LSAR, provisioning and technical publications could require substantial rework of previously-accomplished effort. This is also difficult for the Contractor to accurately estimate and contract for on FFP terms.

In addition to the problems associated with the type of contract vehicle used, the following areas should be fully understood by all parties, thus eliminating potential problem areas:

- During the predesign/preliminary design hase, the logistics influence on design should be substsantial and the documentation minimal.

- If the scope of work changes, the delivery schedule could be impacted.

Thus far, we addressed prime contractor problems and concerns dealing with ILS. However, we should note that any requirement for ILS placed on a prime, will be flowed down to the prime's susbcontractors where applicable. The subcontractors' concerns certainly parallel those of the prime and in many cases are much more serious.

We must all strive to assure that acquisition dollars are identified, appropriated and obligated for ILS in all acquisitions and not be caught up in "hardware only" syndrome. We cannot mortgage the future for hardware dollars today.

DOD 5000.1 possibly sums it up the best, in that, supportability should be equal to cost, schedule and performance of the end hardware product.

Thank You

B. D. Smith, Manager
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ILS FOR OFF-THE-SHELF ITEMS

by Phillip D. Ruth
Rockwell International

A typical military system procurement places great importance upon the use of non-developmental equipment where possible. Commercial, off-the-shelf equipment is one of several classes of items that allow procurement contracting officers to shorten the initial system procurement cycle and reduce acquisition costs. However, to assess the total life-cycle procurement costs of a system that uses off-the-shelf components, the contractor or the buyer must evaluate the possible increased cost risks and overall implementation problems of certain ILS elements. This paper discusses some of the issues that must be considered in planning to use commercial equipment in a military environment.

LSA, RELIABILITY AND MAINTAINABILITY CONSIDERATIONS

The design of most commercial equipment is fixed and is accepted when the contractor decides to propose or the buyer to procure the commercial equipment. As part of the design process, commercial suppliers usually pl.. or assume certain support postures equal to those of the LSA process in a military procurement. Further, reliability and maintainability criteria are usually a fixed part of the commercial design. Support issues related to design that must be considered when selecting commercial equipment include:

a. Inherent reliability of the equipment. This is determined by component parts selection, thermal design, and considerations of cooling, shock and vibration, and power regulation and stability.

b. Maintainability features. These include equipment partitioning, location of test points, accessibility of components, and considerations of human factors and operator/equipment safety.

c. Testability. This includes the use of BIT, BITE, ATE, standard test equipment, and peculiar test equipment. The availability of procedural instructions for serviceability testing and fault isolation are also part of the testability criteria.

d. Maintenance concept definitions, as expressed by technical manual statements of:

   (1) Sparing levels or repair levels

   (2) Recommended test equipment

   (3) Recommendations for contractor repair or support

   (4) Assumed skill levels, as shown by the readability requirements for the technical manuals and the amount of procedural information available for testing, troubleshooting, repair, and maintenance.

TECHNICAL MANUALS

Perhaps one of the most significant ILS problems encountered in using commercial equipment is the availability of adequate technical manuals. Most suppliers develop commercial manuals to support their equipment. However, commercial technical manuals are written to many different formats and can vary from packages of engineering drawings to complete manuals that meet MIL-M-7298C, the military standard for commercial manuals.

If the available commercial manuals meet the minimum military specifications, the initial cost is slight -- usually a small, fixed cost per copy. But many commercial manuals fall short of the desired coverage in one of the following areas.

a. Readability: The reading level of a typical commercial manual is usually higher than that required for military use. This deficiency is usually corrected by preparing supplements and/or offering additional training.

b. Procedural information: Many commercial instruction manuals do not contain adequate test, fault-isolation, and maintenance procedures. The manual must contain at least enough procedures to test and troubleshoot to the lowest level that is spared (lowest repair level). In addition, adequate fault-isolation data (waveforms, V&R data, test point data, etc.) must be available in procedural form or in a logical form that a skilled technician can use.

c. Parts listing information: Commercial parts lists very often fall short in degree of detail as well as in level of coverage. Most commercial parts lists do not include attaching parts or other mechanical/hardware parts as MIL specifications require. Also, they fail to list source/maintenance/recoverability (SMR) codes; these are necessary to allow the purchase and disposition of repaired parts at the specified maintenance levels. Finally, many commercial parts lists do not contain enough data to support the spares and repair planned by the military. Additional parts-list information required for military use is usually supplied in the form of supplements to the commercial manuals.

d. Recommended tools and test equipment: Most commercial suppliers identify the tools and test equipment required to support their equipment. Unfortunately, these items of equipment may not be those that are already in military inventories, or those that will later be defined in test-equipment provisioning conferences. Again, supplements to the commercial manuals can be prepared to supply the needed procedures or information.

e. Revision control: With commercial manuals, the government has limited ability to control revisions of the documentation to ensure that the technical manual matches all models of the equipment in the field. The configuration management practices of most commercial suppliers complicate the problem. Many commercial suppliers control their configurations only at the form, fit, and function level, and notify or submit for approval only changes that affect form, fit, and function interchangeability.

Most commercial suppliers routinely update and/or revise their commercial manuals as they offer modified or revised hardware for sale. The government should obtain negatives of the commercial manual when it purchases the equipment. It can then assign military technical manual numbers to each manual and reprint them as required. If the government owns the manuals, it can revise them each time the equipment changes; then the technical manuals will always match the equipment.

When the available commercial technical manuals do not meet the minimum requirements, the supplier must prepare supplements to the technical manuals that contain the needed information. Manual/supplement combinations are usually harder to use than complete manuals, because they divide the information into two different documents: the technical manual and its supplement. If the military decides not to use supplements, it must procure new MIL-spec manuals. The technical manual procurement cost is then the same as if military equipment and MIL-spec manuals had been procured.

PROVISIONING

Producing an acceptable provisioning document to support a commercial product is sometimes difficult. Most commercial vendors are reluctant to supply data that is not in their commercial catalogs; they restrict data to vendor partnumber identifications. This practice does not satisfy the military's supporting provisioning technical documentation (SPTD) requirements. The data obtained from the vendor must contain sufficient form, fit, and function information to allow cataloging and national stock number assignment. Many commercial suppliers, especially the smaller ones, do not have adequate data. Also, many vendors refuse to supply true manufacturer's part numbers and FSCM's for lower-tiered items, or do so only after a great deal of trouble to the procuring agency.

With commercial equipment and commercial data, the military often lacks configuration control. This lack of control affects both the provisioning document and the parts lists and can result in nonconformity among equipment parts. Non-interchangeable parts intended for the same use can cause significant parts stocking and repair problems.

Very often, commercial equipment is proprietary or contains proprietary parts, and vendors refuse to supply the required data. Even so, the prime contractor remains responsible for supplying the SPTD. In practice, the government often accepts a letter of refusal in lieu of data.

Commercial equipment is generally not designed with standard military parts. To get non-standard parts into the government inventory, the government first requires SPTD data (specifications, standards, drawings, photographs, sketches and descriptions, catalog descriptions, etc.) from the contractor. Obtaining this data increases the contractor's workload and cost. The need to catalog (research government files to find standard parts with matching parameters), stocklist the new part (assign new NSNs), and increase inventory for the new items also increases the government's workload.

SOFTWARE DOCUMENTATION

Normal commercial software documentation consists of manuals that teach the user how to use the equipment programs. The military requires software documentation not only on the use of programs, but also on maintaining and supporting the programs. The situation becomes even more complex if PROM components are used. If the military requires supporting programs for PROMs, the commercial manufacturer often claims that the information is proprietary. Then the customer must stock preprogrammed PROMs.

When systems are procured, the government normally requires system software manuals as a part of the CDRL. The government then requires documentation of all system software, even though commercial equipment is delivered as a part of the system. However, PROM software and commercial equipment software (such as message switch software) information is not delivered if the data is proprietary.

CONTRACTOR SUPPORT VS. ORGANIC SUPPORT

Most commecial suppliers maintain a factory service or service agency to repair and modify their equipment. Since most commercial suppliers are concerned about protecting proprietary design information, they often encourage customers to return the equipment to the factory or a contractor service agency for repairs.

Many commercial vendors will provide only a Certificate of Conformance with a repair. In such cases, the prime contractor often does not have adequate test equipment or documentation to repair the vendor item. Further, the quality requirements imposed on the prime contractor often exceed those that the vendor is willing to meet. The prime contractor must be careful to ensure that a subcontractor will accept the quality requirements that flow down to him.

Training is a service that is available to support most commercial equipment. While the maintenance training may be a little light because of the vendor's desire to keep service in-house, the operator training is usually quite complete and well executed.

Most commercial suppliers provide excellent field engineering support. Here the motive is to ensure that the equipment works well in the field and that performance problems are quickly identified and analyzed.

CONTRACT DATA

Most contract data lists are prepared to support a development program. Thus the engineering data is usually oriented to the plans, procedures, reports, and analyses needed to monitor the design process.

For commercial equipment, design is usually complete. Reputable commercial suppliers normally document this design with commercially formatted data that often meets the tightly controlled content requirements of the CDRL or SDRL.

Sometimes proprietary rights limit the availability of commercial data. In any case, procuring existing data "as is" is more cost-efficient than paying to reformat the data.

RECOMMENDATIONS

In summary, the following recommendations are for both government and industry representatives.

Government

a. Specify the terms in the RFQ by which the commercial support equipment can be offered, including:

   (1) Reliability/maintainability requirements

   (2) Testability criteria

   (3) Acceptability of commercial vendors

   (4) Planned maintenance concept

   (5) BIT/BITE, ATE, standard, and peculiar test equipment requirements

   (6) Rights to data.

b. Specify how LCC computations will be used to compare the cost of acquiring and supporting the commercial equipment vs. the cost of acquiring and supporting a developmental item. Also, specify how these computations will be used in selecting successful contractors, both as to technical approach and as to price.

c. Where commercial equipment is to be procured, increase the emphasis on using existing contractor support facilities rather than spending more to create organic capability.

d. Purchase negatives of commercial manuals with the equipment to ensure revision control.

Industry

a. Develop technical manuals that satisfy the requirements of MIL-M-7298C to support commercial products.

b. Maximize BIT and BITE capabilites in commercial equipment.

c. Define company standards for reliability and maintainability that satisfy a wide range of military requirements, and use the LSA process to ensure that reliability and maintainability are designed into the equipment.

d. Develop company standards for configuration control/accounting that will satisfy at least the form/fit/function interchangeability criteria of most military requirements.

e. Plan for organic support. While the urge is to plan for contractor support, the commercial product that stands the best chance of selling to the military is the one that the military technician can most economically support.

ILS

ILS CONTRACTING GUIDE (DARCOM-P 700-21)

RICHARD MYERS

US ARMY DARCOM MATERIEL READINESS SUPPORT ACTIVITY

ILS INTEGRATED LOGISTIC SUPPORT

ILS CONTRACTING GUIDE
DARCOM P 700 21

BACKGROUND

THERE ARE RECOGNIZED DEFICIENCIES IN

- AMOUNT OF DATA
- TIMING OF DELIVERABLES
- COST OF LOGISTICS PRODUCTS

ILS INTEGRATED LOGISTIC SUPPORT

ILS CONTRACTING GUIDE
(DARCOM P 700 21)

BRIEFING OUTLINE

- BACKGROUND
- CONTENTS OF GUIDE
- STRUCTURE OF GUIDE
- USE OF GUIDE
- SUMMARY

ILS INTEGRATED LOGISTIC SUPPORT

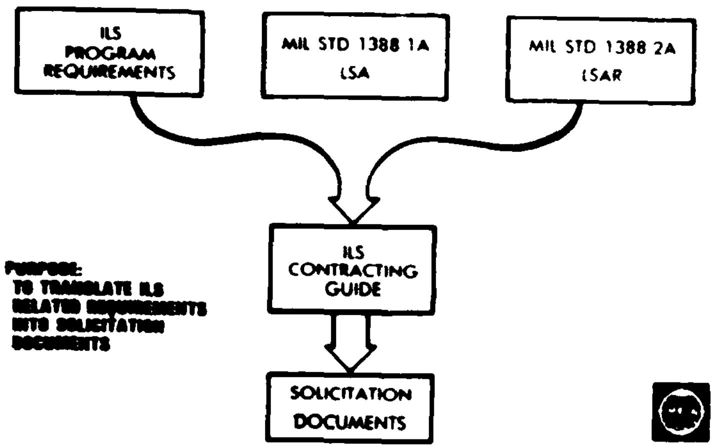
ILS CONTRACTING GUIDE
(DARCOM P 700 21

BACKGROUND (CONT'D)

- RECOGNIZING THE DEF 'IENCIES, HQ DARCOM DIRECTED THE DEVELOPMENT OF THE ONTRACTING GUIDE
- THE AREAS TO BE ADDRESSED WERE
  - MAJOR CONTRACT ACTIONS
  - RFP PREPARATION
  - COST ESTIMATION
  - PROPOSAL EVALUATION
  - CONTRACT PERFORMANCE AND EVALUATION

INTEGRATED LOGISTIC SUPPORT

ILS CONTRACTING GUIDE
(DARCOM P 700 21)



PURPOSE:
TO TRANSLATE ILS RELATED REQUIREMENTS INTO SOLICITATION DOCUMENTS

INTEGRATED LOGISTIC SUPPORT

ILS CONTRACTING GUIDE
(DARCOM-P 700-21)

CONTENTS

INTEGRATED LOGISTIC SUPPORT

ILS CONTRACTING GUIDE
(DARCOM P 700 21)

CONTENTS (CONT'D)

INTEGRATED LOGISTIC SUPPORT

ILS CONTRACTING GUIDE
(DARCOM-P 700-21)

CONTENTS (CONT'D)

INTEGRATED LOGISTIC SUPPORT

ILS CONTRACTING GUIDE

DARCOM-P 700-21

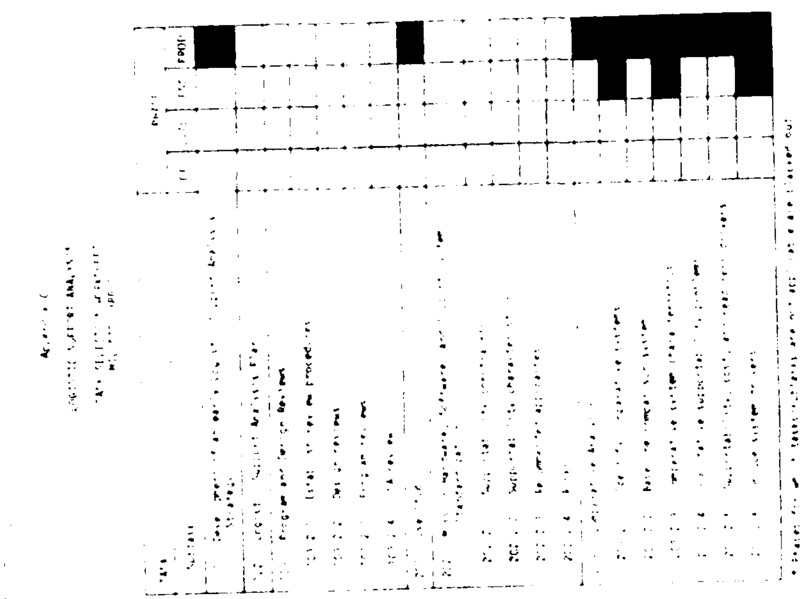
STRUCTURE

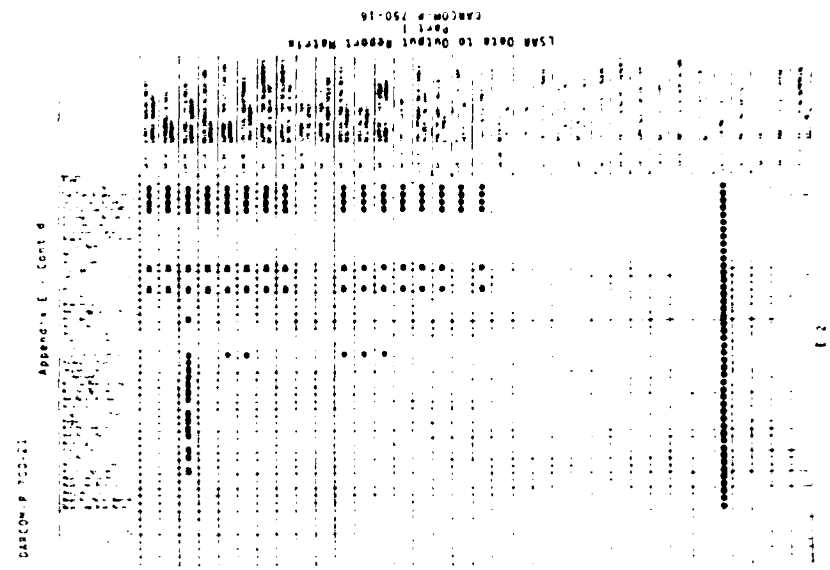
APPENDIX C
LSA TASK SELECTION WORKSHEET

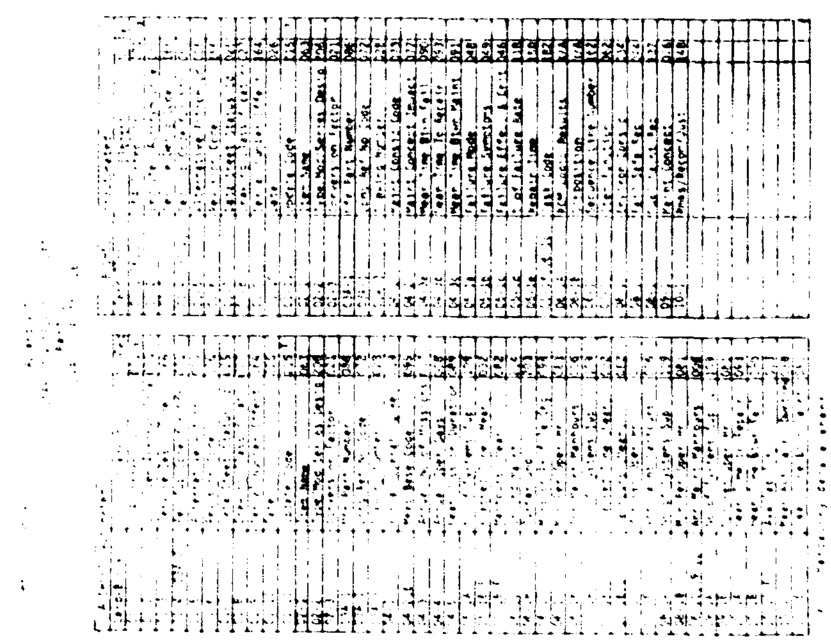
APPENDIX D
LSAR DATA ELEMENT SELECTION SHEET

APPENDIX E
DATA ELEMENT TO OUTPUT REPORT MATRIX

APPENDIX F
DID TO LSAR OUTPUT MATRIX

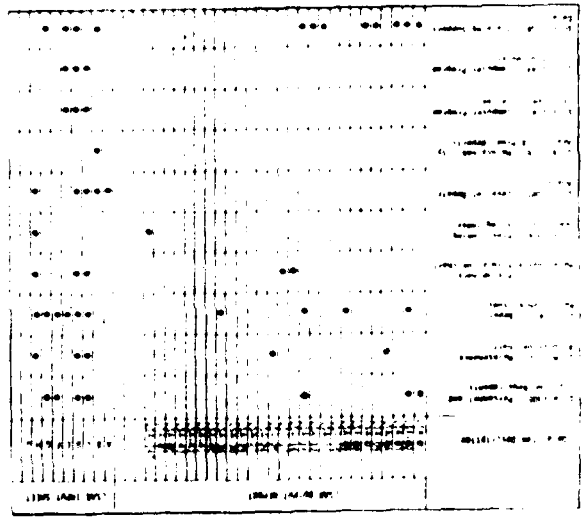






DID Number	Title	ILS Element
DI-A-1005	Progress Status Meeting Report	All elements
DI-H-1300	Personnel and Training Requirements	Manpower and Personnel
DI-H-1326	Explosives Hazard Classification Data	Supply Support
DI-L-1812	Shelf Life Data	Supply Support
DI-L-1821	TMDE Data Sheets	Support Equipment and TMDE
DI-M-1510	Maintenance Allocation Chart	Maintenance Planning
DI-P-1619	Facilities System Performance Data	Facilities
DI-S-1813	Maintenance Support Plan	Maintenance Planning
DI-S-1815	Depot Maintenance Study	Maintenance Planning
DI-S-1825	Preliminary Maintenance Allocation Chart	Maintenance Planning
DI-V-1956	Provisioning Numerical Listing Index	Supply Support
DI-V-2022	Provisioning Parts List/Index	Supply Support
DI-V-2074	Support Equipment List	Support Equipment and TMDE
DI-L-2005	Level of Repair Analysis Report	Maintenance Planning
DI-R-2129	Maintainability Analysis and Production Reports	Maintenance Planning
DI-E-2143	Computer Program Test Specification	Computer Resources Support
DI-T-2144	Computer Program Test Procedures	Computer Resources Support
DI-H-3258	Training Support Data	Training and Training Devices

Index of Data Item Descriptions
Part I by DID Number

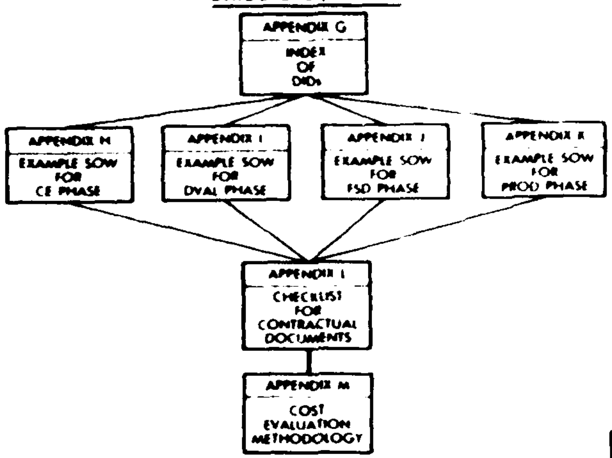


DID to LSAR MATRIX
Part I DARCOM P 750-16

INTEGRATED LOGISTIC SUPPORT

ILS CONTRACTING GUIDE
(DARCOM P 700 21)

STRUCTURE (CONT'D)



ILS Element	Title	DID Number
Maintenance Planning	Maintenance Allocation Chart	DI-M-1510
	Maintenance Support Plan	DI-S-1813
	Depot Maintenance Study	[illegible]
	Preliminary Maintenance Allocation Chart	[illegible]
	Level of Repair Analysis Report	[illegible]
	Maintainability Analysis and Production Reports	[illegible]
	Task Analysis Report	[illegible]
	Optimum Repair Level Analysis Report	[illegible]
	System Safety Hazard Analysis Report	[illegible]
	Task [illegible] Analysis Report	[illegible]
	Reliability Mathematical Models	[illegible]
	Reliability Prediction Report	[illegible]
	Failure Modes, Effects, and Criticality Analysis Report	[illegible]
	[illegible] Documentation of [illegible]	[illegible]
	Maintenance [illegible]	[illegible]
	[illegible] Analysis and Trade [illegible] Report	[illegible]

Index of [illegible]
Part [illegible] By [illegible]

ILS

INTEGRATED LOGISTIC SUPPORT

ILS CONTRACTING GUIDE
(DARCOM-P 700-21)

SUMMARY

- NOT A COOKBOOK! ! !
- LOGICALLY STRUCTURED APPROACH
- ENSURES ALL ILS ELEMENTS ARE CONSIDERED
- CONTAINS WORKSHEETS
- INHERENTLY TAILORABLE

INTRODUCTION - THIS PRESENTATION IS ON THE NEW DARCOM PAMPHLET 700-21, ILS CONTRACTING GUIDE. I WILL COVER WHY THE GUIDE WAS WRITTEN, WHAT IT CONTAINS, HOW THE CONTENTS ARE STRUCTURED AND MY THOUGHTS ON THE USE OF THE GUIDE.

BACKGROUND - 1 - THE CONTRACTING GUIDE CAME ABOUT BECAUSE OF SOME CHRONIC PROBLEMS THE ARMY HAS HAD IN CONTRACTING FOR ILS. THE AMOUNT OF DATA THE GOVERNMENT GETS DID NOT SEEM TO BE QUITE RIGHT. WE BUY EITHER TOO LITTLE OR TOO MUCH. THIS COMES, IN PART, FROM A LACK OF GUIDANCE IN SPECIFYING THE NEEDS OF A PROGRAM AND INSUFFICIENT COORDINATION AMONG ALL OF THE INTERESTED PARTIES. THE SECOND MAJOR AREA IS THE TIMING OF THE CONTRACT DELIVERABLES. THIS REFERS TO SCHEDULING DELIVERY OF A FINAL PRODUCT BEFORE THE SOURCE DATA FOR THAT PRODUCT IS AVAILABLE. THIS PROBLEM GENERALLY ARISES BECAUSE THE INTEGRATION PART OF ILS IS NOT FULLY APPRECIATED. THE COST OF LOGISTICS PRODUCTS IS FREQUENTLY A SOURCE OF CONCERN, PARTICULARLY WHEN IT APPEARS THAT THE GOVERNMENT IS PAYING TWICE FOR THE SAME INFORMATION OR WHEN THINGS ARE DONE AS A PAPER EXERCISE.

BACKGROUND - 2 - WITH LOGISTICS BEING A MORE WIDELY RECOGNIZED CRITICAL ELEMENT OF MATERIEL ACQUISITION AND IN LIGHT OF THE PROBLEMS JUST OUTLINED, HQ DARCOM TASKED MRSA TO DEVELOP THE CONTRACTING GUIDE. THESE WERE THE MAJOR AREAS TO BE COVERED IN THE GUIDE.

CONCEPT - THIS IS A GRAPHIC REPRESENTATION OF HOW THE CONTRACTING GUIDE FITS INTO THE ILS REQUIREMENTS IDENTIFICATION PROCESS. AS THE SLIDE INDICATES THE INTENDED PURPOSE OF THE GUIDE IS TO TRANSLATE ILS REQUIREMENTS INTO THE FORM AND FORMAT REQUIRED FOR SOLICITATION DOCUMENTS AND CONTRACT PACKAGES.

CONTENTS - 1 - THE GUIDE CONSISTS OF EIGHT CHAPTERS AND FIFTEEN APPENDICES.

- THE INTRODUCTION DESCRIBES WHAT THE GUIDE IS, IT'S PURPOSE, AND HOW TO SUBMIT RECOMMENDED CHANGES.

- CHAPTER 2 OUTLINES THE CONTRACTING PROCESS. IT INCLUDES A BRIEF DESCRIPTION OF THE GENERAL TYPES OF CONTRACTS. ALSO INCLUDED IS THE THREE PHASES OF THE CONTRACTING PROCESS, PLANNING AND PRESOLICITATION, SOLICITATION AND AWARD, AND POSTAWARD ADMINISTRATION. IT IS PROVIDED AS INFORMATION TO GIVE THE LOGISTICIAN SOME PERSPECTIVE OF THE PROCESS.

- CHAPTER 3 IS A DISCUSSION OF THE GENERAL CHARACTERISTICS OF AN ILS SCOPE OF WORK. IT CONTAINS AN OUTLINE FOR THE SOW AND STRESSES THE NEED FOR COORDINATION AND INTEGRATION. THE ELEMENTS OF AN ILS PROGRAM ARE DEFINED IN THIS CHAPTER TO INDICATE WAHT THE SOW NEEDS TO COVER.

- CHAPTER 4 ADDRESSES ILS CONSIDERATIONS FOR THE ACQUISITION OF NONDEVELOPMENT ITEMS. THE PURPOSE OF THIS CHAPTER IS TO DISCOURAGE THE IDEA THAT SELECTION OF AN NDI AUTOMATICALLY ELEMINATES THE NEED TO CONSIDER ILS, THE PRIMARY DIFFERENCES BETWEEN A DEVELOPMENT PROGRAM AND AN NDI WILL INVOLVE OPTIONS AVAILABLE TO THE GOVERNMENT AND THE AMOUNT OF DATA TO BE DEALT WITH. THE CHAPTER INCLUDES CONSIDERATIONS IN CONTRACTING FOR ILS AND TAILORING THE ELEMENTS OF ILS FOR NDI ACQUISITIONS.

- CHAPTER 5 COVERS LSA/LSAR COST EVALUATION. THE CHAPTER PROVIDES AN OVERVIEW OF THE METHODOLOGY CONTAINED IN APPENDIX N OF THE GUIDE. THIS METHODOLOGY WAS DEVELOPED TO BE USED AS A MEANS TO PREDICT OR EVALUATE THE PROPOSED COSTS FOR AN LSA/LSAR EFFORT. THE METHODOLOGY INCLUDES BOTH DETAILED COST ESTIMATING AND PARAMETRIC COST ESTIMATING.

- CHAPTER 6 IS INTENDED TO PROVIDE OVERVIEW OF THE PROPOSAL EVALUATION AND SOURCE SELECTION PROCESS. IT COVERS ESTABLISHMENT OF SELECTION CRITERIA AND REVIEW PROCEDURES. IT ALSO CONTAINS SPECIFIC CONSIDERATIONS FOR ILS EVALUATION AND SELECTION CRITERIA. THE LOGISTICIAN SHOULD BE AWARE OF THESE FACTORS SO THAT A SOW IS PREPARED TO FACILITATE DETERMINATION OF EVALUATION CRITERIA.

- CHAPTER 7 IS A DISCUSSION OF THE ELEMENTS INVOLVED IN CONTRACT PERFORMANCE EVALUATION. INCLUDED ARE STANDARD FORM PROGRESS REPORTS AND DISSCUSSION OF ILS MANAGEMENT TEAMS AND LSA REVIEW TEAMS.

- CHAPTER 8 EXPLAINS THE SEQUENCE OF THE FUNCTIONAL APPENDICES. IT GIVES MY THOUGHTS ON HOW THE GUIDE WILL BE USED TO DEVELOP AN ILS SOW. I WILL EXPLAIN THE PROCESS FLOW SHORTLY.

CONTENTS - 2 - THE APPENDICES CONSTITUTE THE BULK OF BOTH THE PAMPHLET AND THE GUIDANCE.

APPENDIX A - A LISTING AND EXPLANATION OF TERMS COMMONLY USED IN THE ACQUISITION AND CONTRACTING PROCESS.

APPENDIX B - A LISTING OF NUMBERS AND TITLES OF REGULATIONS, PAMPHLETS, STANDARDS, AND HANDBOOKS RELATED TO ILS AND THE ACQUISITION PROCESS.

APPENDIX C IS A CHECKLIST OF THE LSA TASKS AND SUBTASKS CONTAINED IN MIL-STD-1388-1A. TASKS WILL BE SELECTED BASED ON THE SPECIFIC REQUIREMENTS OF THE PROGRAM. ONCE FILLED OUT, THE LIST CAN BE USED AS A WORKSHEET FOR THE SOW AND, IF DESIRED, INCLUDED IN THE CONTRACT PACKAGE.

APPENDIX D CONTAINS THE LSAR DATA. IT IS IN TWO PARTS, ONE BASED ON DARCOM-P 750-16 AND THE SECOND BASED ON THE PROPOSED MIL-STD-1388-2A. LIKE APPENDIX C IT CAN BE USED AS A WORKSHEET AND AS PART OF THE CONTRACT PACKAGE.

APPENDIX E IS A MATRIX WHICH CORRELATES LSAR DATA ELEMENTS TO OUTPUT REPORTS GENERATED BY THE AUTOMATED LSAR ADP SYSTEM. THERE ARE TWO PARTS TO THIS APPENDIX AS WELL. ONE FOR THE CURRENT ARMY SYSTEM AND ONE FOR THE PROPOSED DOD SYSTEM.

APPENDIX F IS A MATRIX WHICH SHOWS THE APPLICABILITY OF LSAR TO SATISFY DID REQUIREMENTS. THE MATRIX COVERS BOTH AUTOMATED OUTPUTS AND THE INPUT DATA SHEETS FOR THE CURRENT SYSTEM AND THE PROPOSED SYSTEM.

STRUCTURE 2

APPENDIX G IS A CROSS REFERENCE OF DID NUMBER AND TITLE TO APPLICABLE ILS ELEMENT.

APPENDICES H THROUGH K ARE EXAMPLE SOW's KEYED TO ESTABLISHING ILS REQUIREMENTS RELATIVE TO THE LIFE CYCLE PHASE OF THE ACQUISITION. THESE ARE INTENDED AS SAMPLES ONLY AND ARE NOT CONSIDERED SUITABLE FOR USE AS WRITTEN.

APPENDIX L IS A CHECKLIST DEVELOPED BY MRSA FOR EVALUATING RFP's, IFB's AND OTHER CONTRACTUAL DOCUMENTS. IT IS A MANAGEMENT TOOL, USEFUL IN DETERMINING IF THE PROGRAM REQUIREMENTS ARE ADDRESSED. THE LIST IS NOT CONSIDERED TO BE ALL-ENCOMPASSING OR COMPLETE. IT SHOULD BE USED AS A GUIDE.

APPENDIX M IS A CHART OF THE VARIOUS TYPES OF CONTRACTS USED ALONG WITH THEIR APPLICABILITY AND ANY RESTRICTIONS. IT IS INCLUDED FOR INFORMATION AS THE CHOICE OF CONTRACT TYPE IS MADE BY CONTRACT SPECIALISTS.

APPENDIX N IS THE MRSA DEVELOPED COST EVALUATION METHODOLOGY. ITS PRESENT FORM ADDRESSES LSA/LSAR. THE SAME SORT OF METHODOLOGY IS BEING DEVELOPED THAT ADDRESSES ALL THE ELEMENTS OF ILS.

APPENDIX O CONTAINS A LIST OF THE ACRONYMS COMMONLY USED IN ILS.

STRUCTURE 1. THE PROCESS FLOW I ENVISION FOR USE OF THIS GUIDE IS ILLUSTRATED ON THIS AND THE FOLLOWING SLIDE. IT IS A STRAIGHT LINE PROCESS WITH EACH STEP LEADING TO THE NEXT. THE STEPS MAY BE ITERATED AS REQUIREMENTS ARE REFINED UNTIL EVERYTHING HAS BEEN IDENTIFIED AND DOCUMENTED.

- THE PROCESS BEGINS USING APPENDIX C TO SELECT THOSE LSA TASKS AND SUBTASKS THAT ARE APPROPRIATE FOR THE ACQUISITION AND THE LIFE CYCLE PHASE. MIL-STD-1388-1A DESCRIBED THESE TASKS AND ALSO INDICATES WHAT THE OUTPUT OF THE ANALYSIS SHOULD BE.
- BASED ON THIS, THE INDIVIDUAL LSAR DATA ELEMENTS CAN BE SELECTED USING APPENDIX D. THOSE DATA ELEMENTS WHICH ARE REQUIRED FOR COMPUTER PROCESSING ARE PRE-MARKED.

- ONCE THE DATA ELEMENTS ARE SELECTED, THEY CAN BE MATCHED TO THE OUTPUTS. THE MATRIX IN APPENDIX E IS TO BE USED TO ENSURE THAT ALL DATA FOR A GIVEN REPORT IS IN FACT SELECTED. THE REQUIRED REPORTS CAN THEN BE CITED ON THE LSAR DID.

- THE MATRIX IN APPENDIX F IS THEN USED TO DETERMINE WHICH DID's CAN BE SATISFIED BY THE REPORTS SELECTED ABOVE.

- APPENDIX G IS USED TO SELECT SUCH OTHER DID's AS ARE CONSIDERED APPROPRIATE.

- BASED ON THE LIFE CYCLE PHASE, ONE OF THE EXAMPLE SOW's IS PICKED AND THE REQUIREMENTS IDENTIFIED ARE FITTED INTO THE APPROPRIATE PARAGRAPHS. THE VERBIAGE IS MODIFIED TO EXACTLY FIT THE ILS PROGRAM.

- THE CHECKLIST AT APPENDIX L OR A SIMILAR DEVICE CAN THEN BE USED TO MAKE SURE THE REQUIREMENTS ARE COVERED IN THE SOW.

- THE COST EVALUATION METHODOLOGY FOR LSA/LSAR CAN BE USED EITHER TO PREDICT THE PROGRAM COSTS BASED ON THE IDENTIFIED REQUIREMENTS OR TO EVALUATE A CONTRACTOR'S PROPOSAL.

SUMMARY

THE FIRST BULLET ON THIS CHART CANNOT BE OVERSTATED. THERE IS NO WAY THIS SHOULD BE CONSIDERED A COOKBOOK. IT AN APPROACH TO DEVELOPING AN ILS SOW THAT IS LOGICALLY STRUCTURED. IT ENSURES THAT ALL ILS ELEMENTS WILL AT LEAST BE LOOKED AT. THE WORKSHEETS IN THE GUIDE CAN BE USED AS ATTACHMENTS TO THE CONTRACTUAL PACKAGE OR JUST AS WORKSHEETS. THE DESIGN OF THE GUIDE AND THE STEP-BY-STEP PROCESS DOES MAKE THE EFFORT INHERENTLY TAILORABLE.

LUNCHEON ADDRESS

SPEAKER: Robert V. Brown, Assistant to Commander, Air Force Acquisition Logistics Center, Wright Patterson AFB

The videotape, "A New Dimension in Weapon Systems Design", communicates to AFSC Command and industry engineers and scientists the vital importance of the increased emphasis required in designing supportability into future weapon systems. This requirement is described in terms of the projected threat/environment in the 21st century. It includes General Marsh (AFSC/CC), General Mullins (AFLC/CC), and General Minter (USAFE/CC) as well as specific examples within several different engineering design disciplines. These examples show how we can overcome the support constraints of a weapon system by availability consideration early in the design phase, as well as during normal research and development and independent research and development efforts.

Session VII

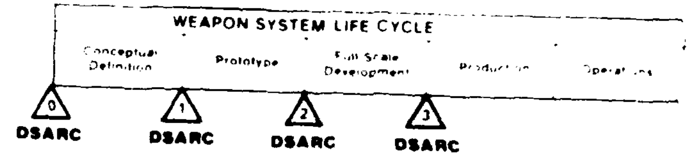
Overview
Product Assurance Role for Integrated Logistics Support (ILS)

D. J. Talley
Vice President - Quality Assurance
General Dynamics, Fort Worth Division
1 December 1983

Product Assurance Role for ILS

- The Weapon System Life Cycle
- Objectives
- Major Concerns
- Previous and Current Actions
- Persistent Weaknesses
- What Can Be Done

DoD and Industry Objectives



CONTRACTOR

- Produce Weapon System
- Meet Specified Requirements
- Reduce Production Cost

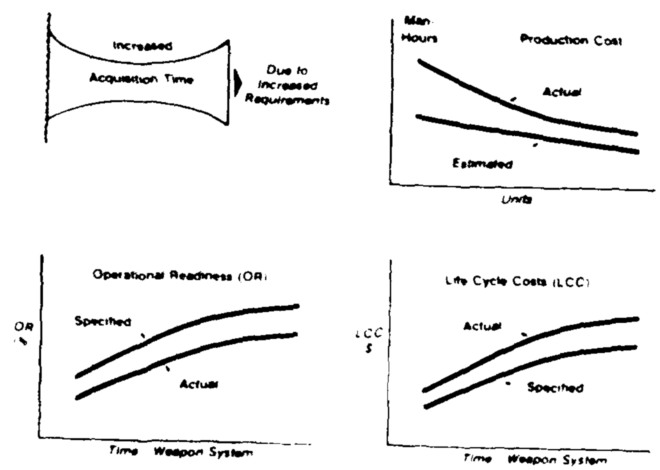
MILITARY

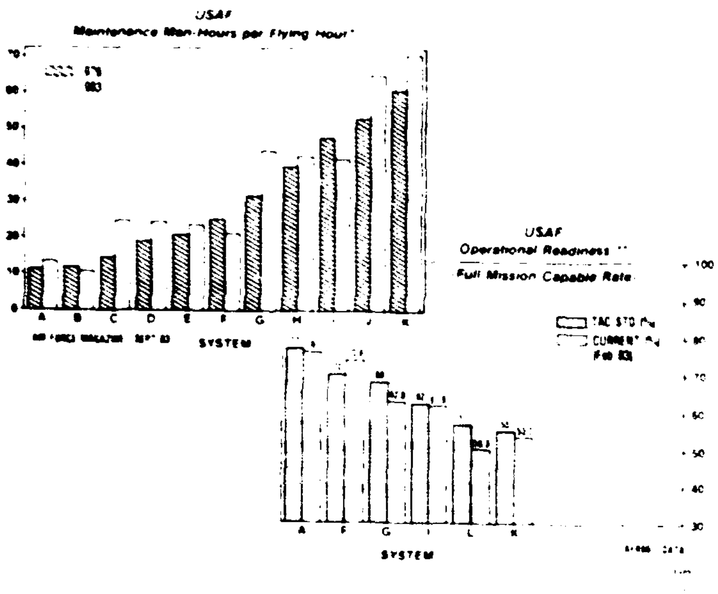
- Use Weapon System
- Experience Specified Requirements
- Reduce Operating Cost

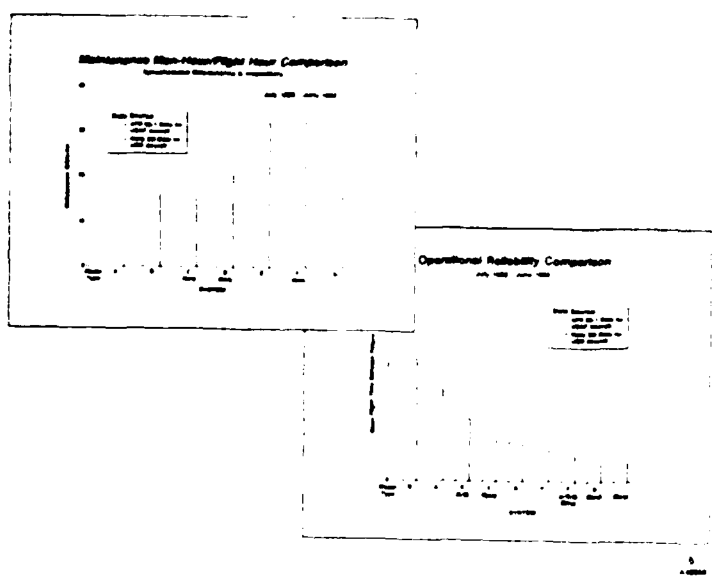
COMMON OBJECTIVES

- Improve Operational Readiness
- Reduce Life Cycle Costs

Major Concerns







Major Concerns Expressed by Management

FOR YEARS NOW. WE VE BEEN TRADING OFF REAL COMBAT CAPABILITY FOR THE ILLUSION OF CAPABILITY · AN ILLUSION OF TOTAL NUMBERS IN AN INVENTORY. NOT OF SORTIES THAT CAN BE FLOWN OR ORDNANCE THAT CAN BE DELIVERED

"FUTURE WARS WILL BE CONDUCTED ON A COME AS YOU ARE BASIS AND WITHOUT ADEQUATE LOGISTICS. THE BEST EQUIPMENT AND THE FINEST MEN WILL BE FIGHTING ON THE LOSING SIDE

"IN THE LONGER TERM, THE SOLUTION MAY BE TO DESIGN SYSTEMS THAT ARE SO RELIABLE AND DURABLE THAT THEY NEED FEWER SPARE PARTS AND LESS LOGISTICS SUPPORT. THAT WAY WE COULD MAINTAIN A HIGH OPERATIONAL READINESS."

Gen James P Mullins
AFLC Commander
Air Force Magazine, September 1983

"SEVENTY TO SEVENTY-FIVE PERCENT OF ALL MAINTENANCE IN AVIONICS UNLESS THE SYSTEM IS BUSSED. INVOLVES PINS AND PLUGS ELIMINATE THE PIN AND PLUG PROBLEMS AND YOU VE JUST CUT MAINTENANCE BY SEVENTY-FIVE PERCENT."

Robert W Brown
AFALD
Air Force Magazine, September 1983

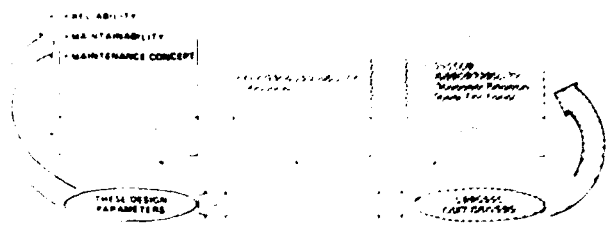
Bottom Line I Conference
MAY 13, 1982 · FT McNAIR

- The Message
  - EQUIPMENT AND SYSTEMS ARE UNRELIABLE AND HARD TO MAINTAIN
  - DOLLARS SPENT ON SCRAP, REWORK AND REPAIR RESULT IN LOST DoD BUYING POWER
  - DoD CAN NO LONGER TOLERATE THE COST OF THE HIDDEN FACTORY
  - QUALITY IS A JOINT CONTRACTOR DoD EFFORT
  - QUALITY IS THE RESPONSIBILITY OF MANAGEMENT
  - QUALITY MUST BE DESIGNED AND BUILT IN
  - QUALITY IS A COST SAVER
  - IMPROVED QUALITY INCREASES PRODUCTIVITY

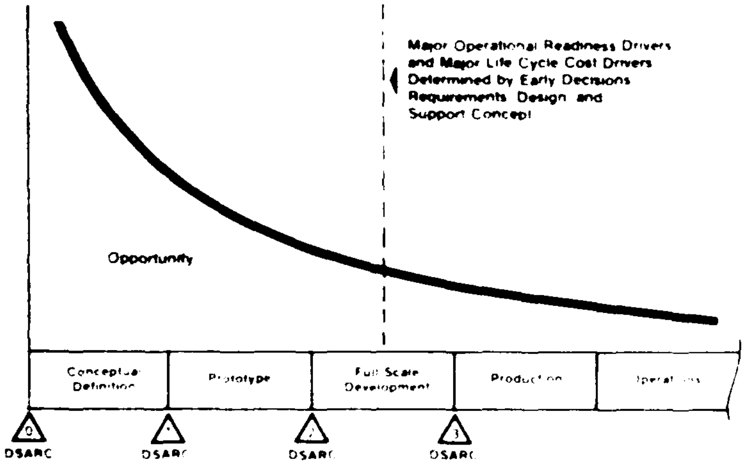
QUALITY IS THE BOTTOM LINE!

Quality Policy

Total Life Cycle Costs



Operational Readiness Improvement and Life Cycle Cost Reduction Opportunity



Previous and Current Actions

PRODUCTION | **OPERATIONS**

DESIGN — DEVELOP — FAB — TEST — DEPLOY — FLY — MAINTAIN

PRODUCTION

- Stress Derating Criteria
- FMEAs
- R&M Predictions Allocations
- R&M Math Models
- Support Simulation Models
- RIWs
- Maintainability Guarantees
- Maintenance Support Plans
- Design Reviews PDR CDR
- Design to Cost
- Sneak Circuit Analysis
- Qualification Tests
- MIL STD 781 Reliability Tests
- R&M Demos
- Test Analyze & Fix (TAAF)
- Burn In & Life Tests (RAT)
- Producibility Reviews
- Production Readiness Reviews (PRR)
- Technology Modernization Program
- Multiyear Procurement (MYP)

OPERATIONS

- Prototype Flight Demos
- FSD Flight Evaluations
- Mission Environment Demos
- Pre planned Product Improvement P
- 66-1 Maintenance Management Data System
- Advanced Logistics System (ALS)
- Service Reports (SRs)
- Material Improvement Projects (MIPs)
- Supportability Coordination Projects
- Logistics Integrated Support System (LISS)
- RAMDATA System
- Tech Rep Program
- Targeted Logistics Support Cost Evaluation (TLSC)
- Product Performance Feedback System (PPFS)
- Weapon System Management Information System (WSMIS)

Persistent Weaknesses

PRODUCTION | **OPERATIONS**

DESIGN — DEVELOP — FAB — TEST — DEPLOY — FLY — MAINTAIN

- Repeat Problems
  - Design and Fab
- Simulation Testing
  - Not Real World Operational Environment
- Small Test Sample
  - Qual and Rel Demos Not Total Measure

- Repeat Problems
  - Operations and Maintenance
- More Spares
  - To Cope with Problem
- Corrective Action
  - Often Triggered by Crisis

What Can Be Done?

WEAPON SYSTEM LIFE CYCLE					
Decision Coordination Paper (DCP)	Conceptual Definition	Prototype	Full Scale Development	Production	Operations

CONTRACTOR

- Develop Management System and Controls to Assure Reduction Elimination of Persistent Weaknesses

GOVERNMENT

- Develop Management System and Controls to Assure Reduction Elimination of Persistent Weaknesses

- Jointly Recognize that Most of the Identified Weaknesses Are Common Management Problems and Cannot Be Resolved Unilaterally
- Further Recognize that Because of Contractor Test Limitations that Specified Operational Readiness and Life Cycle Costs Are Not Completely Assured

Proposed Initiatives
for
Product Assurance

Two Major Areas That Require Immediate Improvement

Product Assurance Areas Needing Immediate Improvement

AREA I: FRONT-END LOADING DURING DESIGN & DEVELOPMENT
- Concurrency   R.M&Q FUNDING CONCURRENT WITH ADVANCED DESIGN GO AHEAD
- Corporate Memory - LESSONS LEARNED FROM PREVIOUS CURRENT WEAPONS SYSTEMS

AREA II: FIELD DATA REPORTING DURING OPERATIONS
- R.M&Q Data - EARLIER & MORE ACCURATE
- Feedback to Design - REAL TIME PERFORMANCE FROM DEPLOYED SYSTEMS AND COMPONENTS

TIME WILL NOT ALLOW DETAILED DISCUSSION OF
EACH OF THE ABOVE
SO LOOKING AT ➡ R.M&Q DATA

Proposed Improvements in Existing Field Data Systems for R.M & Q Needs

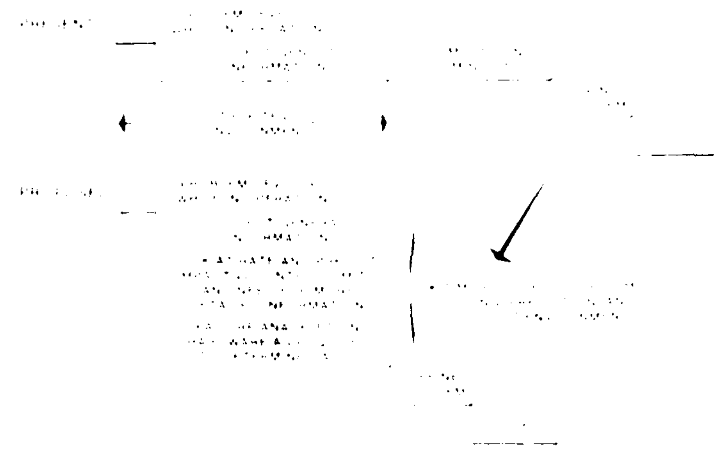
▲ Maintenance Management Data Systems (MMDS)

- AUGMENTATION TO PROVIDE RM&Q DATA NEEDED FOR RAPID PROBLEM IDENTIFICATION & RESOLUTION
- PROVISIONS TO COLLECT DETAILS OF FAILURE AT DEPOT LEVEL
- EXPANDED TO INCLUDE PART HISTORY WHEN SHIPPED OFF BASE
- USE OF "RATE SENSING" TO PROVIDE ANTICIPATORY (PREDICTION TYPE SYSTEM) EARLY WARNING FOR BOTH PREVIOUS AND NEWLY DELIVERED WEAPON SYSTEMS
- REVISION OF DATA FORMS TO PROVIDE COMPLETE FAILURE MALFUNCTION INFORMATION
- IMPROVED DEFECT CODING AND WUC CODES FOR IDENTIFICATION OF "SYSTEMS AND FAMILY" TYPE PROBLEMS

▲ Deficiency Reporting Service Reporting Systems (DR SR)

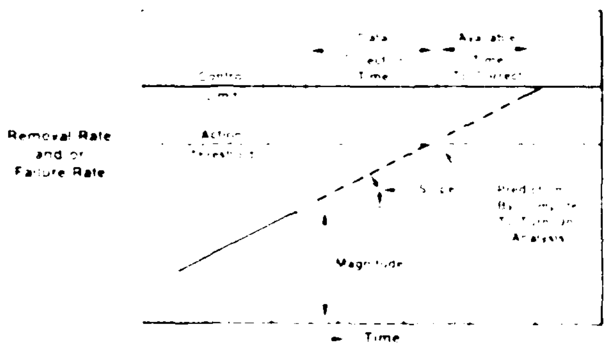
- DATA COORDINATION CORRELATION WITH MMDS
- IMPROVE TO PROVIDE "100" ACCOUNTABILITY ON ALL FAILURES
- UPGRADE TO PROVIDE CORRECTIVE ACTION EVENTS ON PRIORITY BASIS
- USE AS AN ADJUNCT TO THE "RATE SENSING" FEATURE OF THE MMDS TO PROVIDE EARLIER PROBLEM RESOLUTION
- IMPROVE EXISTING SYSTEM TO PROVIDE EXHIBIT ANALYSES EARLIER

Problem Definition Now & Proposed



Rate Sensing
LRU Tracking & "Bad Actor" Determination

(Previous and Recently Delivered Systems)



Computer Provides Continuous Sensing of Magnitude and Slope with a Continuous Prediction of Action threshold Intercept Time and the Time Available to Correct Prior to Exceeding Control Limit

Summary

Product Assurance Role for ILS

- Primary Key for a Cost Effective ILS
- Crucial for Obtaining High Rate of Operational Readiness
- Essential for Obtaining Needed Improvements in the Next Generation Weapon Systems

ILS AND THE ASSURANCE SCIENCES

- 0 STANDARDIZATION PROGRAM IMPACT
- 0 SOFTWARE IMPACT
- 0 SPARES PROCUREMENT ASSURANCE

BY

JOHN P. LESLIE
MANAGER QRA SERVICES, AUDITS AND LIAISON
EQUIPMENT GROUP
TEXAS INSTRUMENTS

IT'S REALLY A PRIVILEGE TO HAVE THIS OPPORTUNITY TO SPEAK TO THIS AUDIENCE OF SPECIALISTS AND PRACTITIONERS OF THE ART OF INTEGRATED LOGISTIC SUPPORT.

VG-1

I THOUGHT I WOULD USE MY ALLOTTED TIME THIS AFTERNOON TO ADDRESS WHAT I CONSIDER TO BE THREE KEY ISSUES THAT RELATE TO THE TOPIC OF "ILS AND THE ASSURANCE SCIENCES". THESE THREE TOPICS ARE:

1) AN EXAMPLE OF THE IMPACT OF A STANDARDIZATION PROGRAM AT TI ON RELIABILITY AND HENCE ON ILS.
2) SOME CONSIDERATIONS AND COMMENTS REGARDING SOFTWARE AND SOFTWARE QUALITY ASSURANCE AND ILS, AND
3) A FEW COMMENTS ON RECENT TRENDS IN SPECIFICATION OF RELIABILITY AND QUALITY ASSURANCE REQUIREMENTS FOR SPARES.

LET ME START FIRST WITH THE SUBJECT OF STANDARDIZATION, RELIABILITY AND ILS, BY USING A REAL EXAMPLE FROM TI.

IN THE EARLY 70s THE NIGHT VISION SYSTEM COMMONLY CALLED "FLIR", FOR FORWARD LOOKING INFRARED SYSTEM, WAS A PROVEN, ALTHOUGH EXTREMELY EXPENSIVE CONCEPT, WHICH HAD BEEN PIONEERED AT TEXAS INSTRUMENTS.

VG-2

IN 1972 DOD REQUESTED A STUDY TO DETERMINE WHY FLIR COST SO MUCH AND WHAT COULD BE DONE ABOUT IT.

VG-3

THIS STUDY IDENTIFIED THE MAJOR FLIR COST VARIABLES AND THE RELATIONSHIP OF THESE TO CHANGES IN PERFORMANCE SPECIFICATIONS. A KEY FINDING WAS THAT A LARGE PERCENTAGE OF THE MANY DIFFERENT FLIR EQUIPMENT CONFIGURATIONS WERE BEING DRIVEN BY RELATIVELY MINOR SPECIFICATION VARIATIONS, AND THIS WAS HAVING MAJOR IMPACT ON THE COST OF THE SYSTEMS. AT TI WE TOOK A CLOSE LOOK AT THE FUNCTIONAL COMPONENTS WHICH CONSTITUTE A TYPICAL FLIR, AND CONCLUDED THAT BY PRODUCING A SET OF STANDARDIZED COMPONENTS, OR COMMON MODULES, A LARGE PERCENTAGE OF DOD FLIR PERFORMANCE REQUIREMENTS COULD BE SATISFIED.

VG-4

THE CONCEPT OF THE COMMON MODULE FLIR IS ILLUSTRATED IN THIS SLIDE WHICH SHOWS, IN THE UPPER BOX, THE BASIC OPERATING PRINCIPLE OF ALL FLIR SYSTEMS. BRIEFLY, INFRARED ENERGY, REPRESENTING THE SCENE OF INTEREST, SHOWN IN THE GREEN BOX BY THE TRUCK DRIVING ALONG A ROAD, IS COLLECTED BY ONE OR MORE SETS OF OPTICAL ELEMENTS AND FOCUSED ONTO AN OSCILLATING MIRROR ASSEMBLY. THIS PORTION OF THE SYSTEM IS SHOWN IN LIGHT BLUE. THIS NON VISIBLE ENERGY IS SCANNED BY THE MIRROR ONTO A MULTI ELEMENT DETECTOR ARRAY WHICH IS COOLED TO CRYOGENIC TEMPERATURES BY THE REFRIGERATOR ASSEMBLY SHOWN IN GREEN. THE ELECTRICAL

SIGNAL FROM THE DETECTOR ARRAY, REPRESENTING ONE LINE OF PICTURE ELEMENTS IS AMPLIFIED BY THE VIDEO AMPLIFIER ELECTRONICS SHOWN IN YELLOW AND CONVERTED TO VISIBLE LIGHT BY THE EMITTER ARRAY. THIS PICTURE LINE, NOW IN VISIBLE LIGHT, IS FOCUSED ONTO THE BACK OF THE SCAN MIRROR AND REFLECTED INTO THE VIDICON CAMERA SHOWN IN DARK BLUE. THE CAMERA FEEDS THE SIGNAL TO A VIDEO DISPLAY TUBE IN THIS ILLUSTRATION, WHERE THE SCENE IS REPRODUCED VISUALLY LINE BY LINE ON THE CRT MUCH AS A COMMON TV PICTURE IS PRODUCED.

OUR STUDY REVEALED THAT THE MAJOR DIFFERENCES FROM SYSTEM TO SYSTEM WERE IN THE FRONT END OPTICS WHICH DEPENDED ON THE SYSTEM CONFIGURATION SUCH AS AIRBORN, GROUND VEHICLE, SHIPBOARD, ETC., AND ON THE DESIRED MEANS OF VIEWING THE IMAGE, SUCH AS ON A CRT AS SHOWN HERE, DIRECT VIEWING OF THE EMITTER ELEMENTS, RECORDING ON FILM, ETC. AS A RESULT, TI PROPOSED, AND DOD EVENTUALLY ADOPTED, A SET OF COMMON HARDWARE OR COMMON MODULES SHOWN IN THE MIDDLE PHOTO, WHICH EVENTUALLY WAS INCORPORATED INTO THE WIDE RANGE OF FLIR SYSTEMS SHOWN IN THE LOWER PHOTO.

VG-5

THE NEXT SLIDE ILLUSTRATES THE IMPACT OF THIS PROGRAM ON FLIR COST. OF COURSE THE IMMEDIATE AND MOST VISIBLE IMPACT WAS ON ACQUISITION COST WHERE A SIGNIFICANT REDUCTION WAS ACHIEVED, LITERALLY SPELLING THE DIFFERENCE BETWEEN AN EXPENSIVE

LABORATORY CURIOSITY, AND A VIABLE, AFFORDABLE WEAPON SYSTEM. BUT AS YOU ALL KNOW, ACQUISITION COST WAS JUST THE TIP OF THE ICEBERG.

VG-6

THERE WAS ALSO TREMENDOUS IMPACT ON THE HIDDEN COSTS LISTED HERE, ALL OF WHICH ARE OF KEY INTEREST TO THE ILS COMMUNITY. OF COURSE GREATER COMMONALITY MEANS FEW SPARES AND REDUCED PROVISIONING AND MANAGEMENT COST. THIS IN TURN RESULTS IN REDUCED NEEDS FOR SPECIAL SUPPORT EQUIPMENT, TRAINING AND DATA. IN ADDITION, THE COMMON MODULE DEVELOPMENT LED TO IMPROVED RELIABILITY, WHICH I'D LIKE TO ADDRESS VERY BRIEFLY.

VG-7

THROUGH DESIGN ACTIVITES SUCH AS SHOWN ON THIS SLIDE, A NUMBER OF KEY RELIABILITY IMPROVEMENTS WERE MADE.

VG-8

FOR EXAMPLE ONLY 39 UNIQUE ELECTRONIC PARTS ARE USED, OF WHICH 26 ARE MIL-STANDARD. ALSO, OPERATING STRESS LEVELS WERE REDUCED AS INDICATED HERE.

VG-9

AS A RESULT OF THESE ACTIONS IT WAS POSSIBLE TO PREDICT A HIGH INHERENT RELIABILITY FOR THE COMMON MODULE SYSTEM AS WELL AS TO CONDUCT EXTENSIVE DEVELOPMENT TESTS AT THE COMPONENT AND MODULE LEVELS.

STILL ANOTHER ILS FALLOUT OF THIS PROGRAM WAS IN THE AREA OF MAINTAINABILITY.

VG-10

THIS CHART ILLUSTRATES TWO LEVELS OF MAINTAINABILITY ACHIEVEMENT FOR THE COMMON MODULE SYSTEM. A SCAN OF THE REQUIRED VERSUS DEMONSTRATED COLUMNS SHOWS ANYWHERE FROM 2 TO 1 TO A GREATER THAN 10 TO 1 RATIO OF REQUIRED VERSUS DEMONSTRATED MEAN REPAIR TIME. THE IMPACT OF THIS PLUS THE RELIABILITY ACHIEVEMENT MENTIONED EARLIER SHOULD BE RECOGNIZED BY THIS AUDIENCE.

VG-11

MY POINT IN DISCUSSING THIS SCENARIO IS THAT I HOPE I HAVE ILLUSTRATED HOW WHAT STARTED OUT AS AN ACQUISITION COST REDUCTION PROGRAM AND PROVED TO BE AN EXTREMELY EFFECTIVE ONE, ALSO HAD MAJOR ILS IMPLICATIONS, AND HOW THESE EVOLVED NOT ONLY THROUGH THE REDUCTION OF SPARES INVENTORY, TRAINING, AND DATA, BUT THROUGH THE AVAILABILITY IMPROVEMENT MADE POSSIBLE THROUGH THE JOINT IMPACT OF THE DESIGN, RELIABILITY MAINTAINABILITY AND ILS COMMUNITIES. INCIDENTALLY, A KEY ELEMENT OF TI'S SUCCESSFUL PRESENTATION OF THIS CONCEPT TO THE DOD WAS THE LIFE CYCLE COST ANALYSIS BASED ON THE ABOVE FACTORS, THAT WAS DEVELOPED THROUGH CLOSE ILS AND PRODUCT ASSURANCE TEAM WORK.

THE SECOND POINT I WANT TO DISCUSS CONCERNS SOFTWARE, OR SOFTWARE QUALITY ASSURANCE, AND ITS IMPACT ON LOGISTICS SUPPORT

I'M SURE YOU'VE ALL SEEN THE NEXT CHART AT SOME TIME OR OTHER, BUT I'M SHOWING IT HERE TO EMPHASIZE A POINT.

VG-12

WHAT THIS SHOWS IS THE PERCENT OF DOD'S COST FOR HARDWARE AND SOFTWARE, AND THE DRAMATIC REVERSAL OVER THE LAST 20 YEARS. SOFTWARE NOW ACCOUNTS FOR OVER 80% OF DOD COST AND THAT NUMBER CONTINUES TO RISE. EVEN MORE SIGNIFICANT IS THE PROPORTION OF THE SOFTWARE RELATED COST THAT IS DEVOTED TO SOFTWARE MAINTENANCE - OVER 70%, A STATISTIC THAT SHOULD BE OF CONSIDERABLE INTEREST TO PEOPLE IN THE LOGISTICS FIELD.

MANY OF US IN THE QUALITY AND RELIABILITY ASSURANCE FIELD HAVE HAD TO REORIENT OUR THINKING TO THIS NEW FACT OF LIFE OVER THE PAST DECADE, AND I WILL ADMIT THAT WE STILL HAVE A WAY TO GO BEFORE WE FEEL TRULY COMFORTABLE WITH SOFTWARE QUALITY ASSURANCE METHODS AND TECHNIQUES.

I WOULD LIKE TO SOUND A NOTE OF CAUTION TO THOSE IN THE ILS COMMUNITY AS WELL. I DON'T SEE A WHOLE LOT OF ATTENTION BEING PAID TO THE SUBJECT OF SOFTWARE IN MANY, IF NOT MOST, ILS PROGRAMS, CERTAINLY NOT THE DEGREE OF ATTENTION THAT THIS CHART WOULD IMPLY IS NECESSARY. LET ME EXPLAIN WHAT I MEAN.

WE ALL KNOW WHAT IS MEANT BY THE HARDWARE CHARACTERISTIC

CALLED, "MAINTAINABILITY". BUT WHAT ABOUT SOFTWARE MAINTAINABILITY? LET ME GIVE YOU A LITTLE BACKGROUND ON SOME CHARACTERISTICS OF SOFTWARE MAINTAINABILITY.

VG-13

THIS CHART SHOWS WHY SOFTWARE MAINTAINABILITY IS SO IMPORTANT. NOTE THE SMALL PROPORTION OF SOFTWARE THAT COULD BE USED "AS DELIVERED" OR AFTER MINOR CHANGES, ABOUT 5% IN THIS EXAMPLE. ALMOST 20% WAS USED ONLY AFTER EXTENSIVE REWORK AND ALMOST 50% WAS NEVER USED SUCCESSFULLY. I DON'T KNOW THE REASONS OR BACKGROUND OF THIS DATA, BUT I DO KNOW THAT A SYSTEM IS JUST AS MUCH OF A SUPPORT PROBLEM WHETHER IT IS "DOWN" BECAUSE OF A SOFTWARE PROBLEM OR A HARDWARE PROBLEM.

VG-14

THIS CHART ILLUSTRATES SOME OF THE HIDDEN SUPPORT COST THAT ACCOMPANY SOFTWARE. MANY OF THESE YOU WILL RECOGNIZE AS SIMILAR TO THE SUPPORT ELEMENTS FOR HARDWARE, AND ILLUSTRATE THE ABSOLUTE NEED FOR SOFTWARE CONSIDERATION IN ANY ILS PROGRAM.

VG-15

THIS NEXT SLIDE SHOWS THAT THE SOURCE OF MOST SOFTWARE ERRORS OCCURS VERY FAR UP STREAM, IN THE REQUIREMENTS ANALYSIS AND DESIGN PHASES, WHICH ACCOUNT FOR 80% OF THE SOFTWARE ERRORS. THIS CHART ALSO ILLUSTRATES THE DRAMATIC INCREASE IN THE COST OF CORRECTING ERRORS, WHICH IS A FACTOR OF 3 TIMES HIGHER IN THE OPERATIONAL PHASE THAN IF CORRECTED IN THE DESIGN PHASE, AS AN EXAMPLE.

VG-16

THIS FIGURE ILLUSTRATES SOME OF THE ATTRIBUTES OF SOFTWARE THAT CAN BE USED TO MEASURE AND CONTROL ITS IMPACT ON SYSTEM PERFORMANCE AND ABAILABILITY. THERE ISN"T TIME HERE TO GO INTO THESE BUT THE POINT IS THAT TECHNIQUES AND MEASURES ARE BEING DEVELOPED TO TAKE SOFTWARE DEVELOPMENT FROM A "BLACK ARE" TO SOMETHING AT LEAST RESEMBLING A SCIENCE.

VG-17

HERE ARE A FEW DEFINITIONS OF THESE FACTORS THAT YOU CAN SCAN. I WOULD SUGGEST THAT THERE IS MUCH TO BE DONE IN THIS AREA AND THAT ANY ILS PROGRAM SHOULD PROVIDE FOR APPROPRIATE MEASURES TO ADDRESS SOFTWARE SUPPORT ISSUES.

MY FINAL POINT TODAY CONCERNS THE SUBJECT OF SPARES PROCUREMENT. OF COURSE WE ARE ALL CONCERNED OVER THE INCIDENTS WHICH HAVE RECEIVED WIDE PUBLICITY IN RECENT MONTHS. I'M SURE THIS AUDIENCE IS VERY FAMILIAR WITH THIS SUBJECT.

I HAVE NOTICED HOWEVER, A RECENT TREND ON THE PART OF DOD TO ADD VARIOUS "ASSURANCE" REQUIREMENTS TO SPARES PURCHASES, REQUIREMENTS THAT TYPICALLY HAVE NOT BEEN IMPOSED IN THE PAST. OF COURSE I HAVE NO WAY OF KNOWING WHETHER THESE REQUIREMENTS ARE THE RESULT OF A WELL THOUGHT OUT NEEDS ANALYSIS, OR WHETHER THEY REPRESENT AN OVER REACTION SOMEWHERE IN THE LOGISTICS SUPPORT/PROCUREMENT CHAIN. I DO KNOW THAT THESE REQUIREMENTS WILL ADD ADDITIONAL COST, AND WHAT'S MORE IMPORTANT, MAY NOT HAVE ANY APPRECIABLE IMPACT ON SYSTEM PERFORMANCE. TWO EXAMPLES ARE ILLUSTRATED ON THIS SLIDE.

VG-18

I WOULD URGE THOSE OF YOU WHO HAVE ANYTHING TO DO WITH ESTABLISHING SPARES PROCUREMENT CONTRACTS, ON BOTH SIDES OF THE TABLE, TO BE SURE THAT YOU INSIST THAT YOUR RELIABILITY AND QUALITY ASSURANCE PEOPLE KNOW WHY THESE REQUIREMENTS ARE BEING IMPOSED, WHAT THEY ARE SUPPOSED TO ACCOMPLISH, AND WHETHER IN FACT THEY DO WHAT THEY ARE SUPPOSED TO.

I GUESS I'VE USED UP MY ALLOCATED TIME SO I'LL STOP. I HOPE I'VE GIVEN YOU SOME FOOD FOR THOUGHT IN WHAT I CONSIDER TO BE THREE CRITICAL SUPPORT AREAS - STANDARDIZATION, SOFTWARE, AND SPARES PROCUREMENT ASSURANCE.

THANK YOU

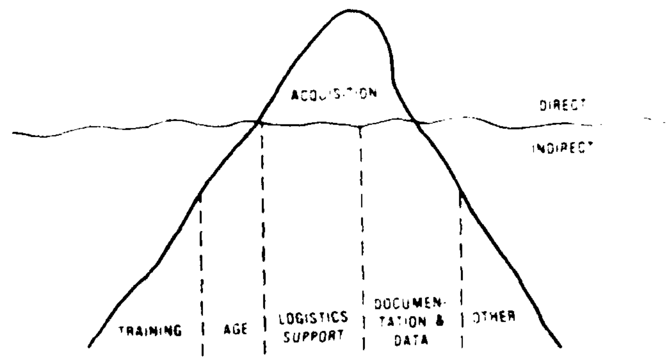
DDR&E REQUEST FOR INDUSTRY STUDY ON FLIR COSTS

IN FEBRUARY 1972 DDR&E RECOGNIZING THAT FLIR WAS A PERMANENT AVIONICS-VISIONICS REQUIREMENT BUT THAT ITS COST WOULD PRECLUDE SIGNIFICANT DEPLOYMENT REQUESTED A STUDY TO DETERMINE

- WHY DO THEY COST SO MUCH?
- WHAT CAN BE DONE TO REDUCE THE COST?

THE RESULTS OF THIS STUDY LED TO THE **COMMON MODULE CONCEPT.**

DOD COST CONSIDERATIONS



DOD FLIR COST STUDY

- IDENTIFIED MAJOR COST VARIABLES
- RELATED COST VARIABLES AND IMPACT OF PERFORMANCE SPECIFICATIONS
- EXAMINED 'REQUIREMENT' FOR MINOR SPECIFICATION VARIATIONS WHICH HAVE MAJOR COST IMPACT
- EXAMINED OUR LOW COST CONCEPT FOR APPLICATION TO THE FULL RANGE OF DOD FLIR REQUIREMENTS

MODULAR FLIR IMPACT ON COST REDUCTION

- ACQUISITION
- SPARES PROVISIONING AND MANAGEMENT
- SPECIAL SUPPORT EQUIPMENT
- TRAINING
- DATA/DOCUMENTATION (ORIGINATION AND MANAGEMENT)
- IMPROVED RELIABILITY

FLIR COMMON MODULES
DESIGN AND DEVELOPMENT ACTIVITIES

- PART SELECTION CRITERIA
- PART DERATING CRITERIA
- CIRCUIT STRESS ANALYSIS
- FAILURE MODE AND EFFECTS ANALYSIS
- WORST CASE DESIGN ANALYSIS
- THERMAL ANALYSIS
- CIRCUIT SIMPLIFICATION
- RELIABILITY PREDICTION (CLASSICAL)
- RELIABILITY PREDICTION (DUANE GROWTH)
- COMPREHENSIVE TEST PROGRAMS
- POSITIVE CORRECTIVE ACTIONS

RELIABILITY IMPROVEMENT ACTIVITIES
FLIR COMMON MODULES

- HIGH INHERENT (PREDICTED) RELIABILITY ACHIEVED DURING DESIGN PHASE THROUGH COMPREHENSIVE RELIABILITY PROGRAMS
- CRITICAL COMPONENTS SUBJECTED TO SEPARATE AND INTENSE DEVELOPMENT PROGRAMS
- RELIABILITY GROWTH TEST (TAAF) CONCEPT EMPLOYED TO FACILITATE EQUIPMENT MATURITY THROUGH TIMELY, POSITIVE CORRECTIVE ACTION

FLIR COMMON MODULE RELIABILITY
ELECTRONIC PART APPLICATION

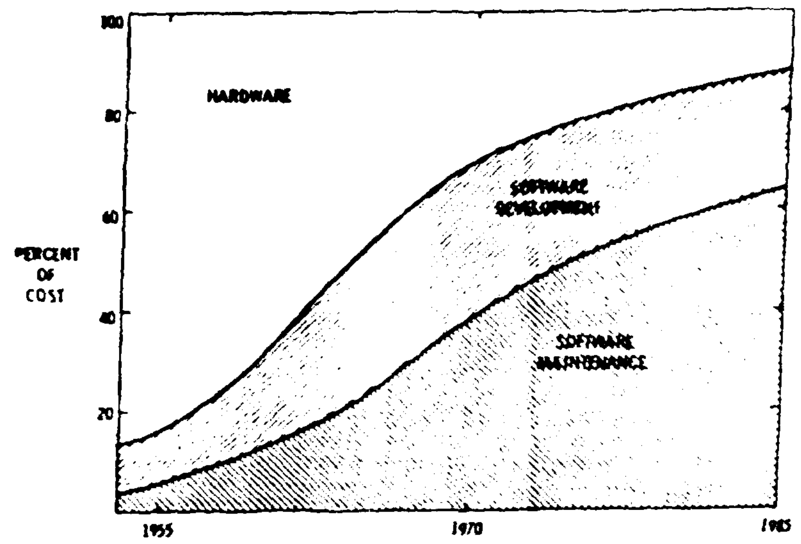
- THE NUMBER OF UNIQUE ELECTRONIC PART TYPES HAS BEEN MINIMIZED
  - ONLY 39 UNIQUE TYPES ARE USED OF WHICH 26 ARE MIL-STD
- PART OPERATING STRESS LEVELS HAVE BEEN MINIMIZED TO REDUCE RATE OF FAILURES
  - OVER 90% OF ALL FLIR COMMON MODULE PARTS OPERATE AT LESS THAN 10% OF THEIR CAPACITY. HIGHEST STRESS IS 65% ON 2 PARTS

MAINTAINABLE

SYSTEM	MEAN REPAIR TIME (MINUTES)			
	ORGANIZATIONAL		INTERMEDIATE	
	REQUIREMENT	DEMONSTRATED	REQUIREMENT	DEMONSTRATED
AN/TAS-4 TOW THERMAL SIGHT	10	4 4	240	31 8
MK-68 EOSS	870	42 2	*	*
AN/AAR-39 A-7 PROTOTYPE	30	16 8	90	37 2
AIR FORCE FLIR PROTOTYPE	45	< 45 0	120	< 120 0
AN/TAS-6 NODLR	10	4 3	240	34 7
AN/AAS-36 P-3 FLIR	30	16 7	40	< 40 0
AN/VSG-2 TANK THERMAL SIGHT	15	9 4	60	29 7
AN/AAR-42 A-7 FLIR	30	15 8	90	36 5
AN/TAS 5 DRAGON THERMAL SIGHT	10	1 0	240	39 4
AN/AAS 37 OV-10 FLIR	30	16 4	*	*
AN/AAQ-9 AIR FORCE FLIR	*	*	45	36 7
AN/AAM 59 SUPPORT EQUIPMENT	*	*	90	22 3

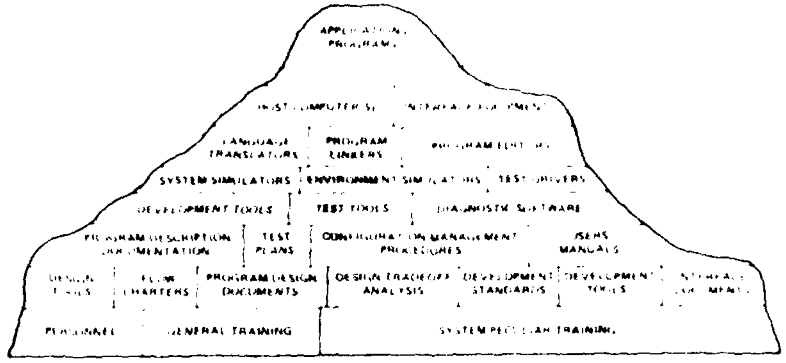
* NO CONTRACT REQUIREMENT

HARDWARE/SOFTWARE HISTORICAL COSTS



THE SOFTWARE ICEBERG

HIDDEN ELEMENTS OF SOFTWARE SUPPORT



FROM MANAGING FIRMWARE FOR WEAPON SYSTEMS AN AIR FORCE VIEW DAVID A. HERRELKO PROCEEDINGS IEEE COMPUTER SOCIETY WORKSHOP ON MICROPROCESSORS IN MILITARY AND INDUSTRIAL SYSTEMS JAN 80

- Nationwide Questionnaire Given To 163 Software Contractors
- Nine Contracts Totaling $6.8 Million Were Analyzed And Verified Questionnaire Responses

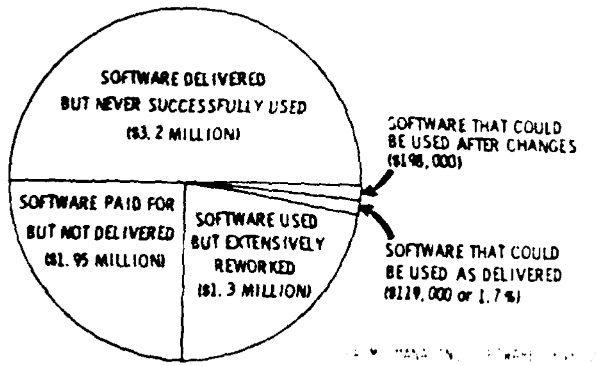
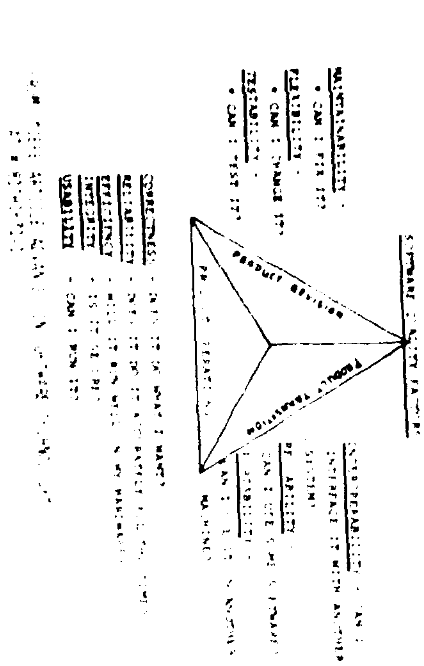


Table 3.1-1 Definition of Software Quality Factors

CORRECTNESS	Extent to which a program satisfies its specifications and fulfills the user's mission objectives.
RELIABILITY	Extent to which a program can be expected to perform its intended function with required precision.
EFFICIENCY	The amount of computing resources and code required by a program to perform a function.
INTEGRITY	Extent to which access to software or data by unauthorized persons can be controlled.
USABILITY	Effort required to learn, operate, prepare input, and interpret output of a program.
MAINTAINABILITY	Effort required to locate and fix an error in an operational program.
TESTABILITY	Effort required to test a program to insure it performs its intended function.
FLEXIBILITY	Effort required to modify an operational program.
PORTABILITY	Effort required to transfer a program from one hardware configuration and or software system environment to another.
REUSABILITY	Extent to which a program can be used in other applications - related to the packaging and scope of the functions that programs perform.
INTEROPERABILITY	Effort required to couple one system with another.



REAL REQUIREMENTS OR REACTION?

INNOVATION AND PREVENTION OF ERROR,
THE WAY TO ILS SUCCESS

PREPARED FOR:

THE 1983 ILS SYMPOSIUM

SPONSORED BY:

AMERICAN DEFENSE PREPAREDNESS ASSOCIATION

PREPARED BY:

JOHN BEZNER

MANAGER, PRODUCT ASSURANCE SERVICES

MARTIN MARIETTA ORLANDO AEROSPACE

1 DECEMBER 1983

OUTLINE

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- o PRODUCTION -- BOW WAVE OF THE 80'S
- o USER - CONSTANT AWARENESS

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- o INNOVATION IS THE KEY
- o AN EXAMPLE: REMOTE AUTOMATIC CALIBRATION

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- o PREVENTION OF ERROR IS THE KEY
- o MAKE IT LIKE THE PRINT
- o AN EXAMPLE: COMMITMENT TO EXCELLENCE

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- o KEY POINTS
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INNOVATION AND PREVENTION OF ERROR,
THE WAY TO ILS SUCCESS

I. INTRODUCTION

MY MESSAGE TODAY IS THAT INNOVATION IS THE KEY TO SUCCESS IN DESIGN, AND THAT PREVENTION OF ERROR IS THE KEY TO LOW COST, HIGH QUALITY PRODUCTION.

A SUCCESSFUL WEAPON SYSTEM IS ONE THAT HAS BEEN PROPERLY DESIGNED TO ACHIEVE THE STATED REQUIREMENTS, HAS BEEN FAITHFULLY PRODUCED ACCORDING TO THAT DESIGN, AND IS USED AND SUPPORTED BY TRAINED, MOTIVATED PERSONNEL. THE IMPORTANCE OF THE ASSURANCE SCIENCES IN ACHIEVING THIS DESIRED SUCCESSFUL PRODUCT, CANNOT EASILY BE OVERSTATED.

RELIABILITY AND MAINTAINABILITY AS CHARACTERISTIC OF DESIGN PROBABLY REACHED THEIR HIGHEST POINT OF POPULAR EMPHASIS DURING THE 70'S. RECOGNITION OF THE IMPORTANCE OF DESIGNING RELIABILITY AND MAINTAINABILITY INTO A PRODUCT CAME IN THE FORM OF SPECIAL CONTRACT CLAUSES, THE DEVELOPMENT OF GRADUATE LEVEL PROGRAMS THROUGHOUT THE COUNTRY, AND IN SYMPOSIUMS SUCH AS THIS ONE, DEVOTED ENTIRELY TO THE ASSURANCE SCIENCES.

AS THE DECADE OF THE 80'S UNFOLDS, WE IN THE DEFENSE INDUSTRY ARE FEELING THE INFLUENCE OF A BOW WAVE OF PRODUCTION. THE FAMILY OF WEAPON SYSTEMS CONCEIVED AND DESIGNED IN THE 70'S ARE NOW REQUIRED IN GREAT NUMBERS TO REPLACE AGING EQUIPMENT AND TO STRENGTHEN THE COUNTRY'S DEFENSE CAPABILITY. THUS THE DIFFICULTY OF MAINTAINING HIGH STANDARDS OF QUALITY IN THE FACE OF MASS OR HIGH PRODUCTION LEVELS HAS BECOME INCREASINGLY EVIDENT. THIS DIFFICULTY EXTENDS FROM CAPITAL EQUIPMENT NEEDS, TO FACILITY NEEDS, TO MORE AND BETTER TRAINED PEOPLE.

FROM THE USER'S PERSPECTIVE THE NEED FOR CONSTANT AWARENESS HAS OBVIOUSLY NOT DIMINISHED. THE USER MUST NOW BE EVEN MORE AWARE OF THE PRODUCTION PROBLEMS FACED BY THE NATION'S DEFENSE CONTRACTORS TO GO ALONG WITH HIS UNDERSTANDING OF THE DESIGN CHALLENGES. WITHOUT THIS AWARENESS AND UNDERSTANDING, THE END PRODUCT PLACED IN THE HAND OF THE FIGHTING MAN WILL NOT BE THE BEST WE COLLECTIVELY CAN ACHIEVE.

I'D LIKE TO CONCENTRATE MY DISCUSSION ON DESIGN AND PRODUCTION, INDUSTRY'S JOB. I'LL MAKE ONLY TWO BRIEF COMMENTS REGARDING THE USER'S JOB, AS SEEN FROM THE INDUSTRY VIEWPOINT.

II. DESIGN

THERE ARE A LARGE NUMBER OF FACTORS CRITICAL IN PULLING A SUCCESSFUL DESIGN TOGETHER: EXPERIENCE, TALENT, ORGANIZATION, COMMUNICATIONS SKILL, ETC. HOWEVER, IN TODAY'S FAST MOVING, HIGH TECH ENVIRONMENT, I BELIEVE INNOVATION IS THE CRITICAL ATTRIBUTE — THE ABILITY TO RECOGNIZE SOLUTION PATHS THAT OTHERS MIGHT OVERLOOK.

THE NEW CAPABILITY AND CAPACITY OF OUR COMPUTERS AND ELECTRONIC INSTRUMENTS, THE BREAKTHROUGHS IN SCIENCE, AND THE DEGREE OF SOPHISTICATION REQUIRED IN TODAY'S MODERN WEAPON SYSTEMS, DEMAND THAT OUR BRIGHT PEOPLE

RECOGNIZE AND TAKE ADVANTAGE OF EACH AND EVERY ONE OF THESE OPPORTUNITIES FOR INCREASED PERFORMANCE.

A PERFECT EXAMPLE OF INCREASED ILS PERFORMANCE COMES FROM SOMETHING JUST RECENTLY DEVELOPED AT MY HOME BASE, MARTIN MARIETTA ORLANDO AEROSPACE. IT'S CALLED REMOTE AUTOMATIC CALIBRATION.

AS YOU KNOW, ONE OF THE SIGNIFICANT ELEMENTS OF DOWNTIME IN MODERN WEAPON SYSTEMS IS PERIODIC VERIFICATION/CALIBRATION OF ELECTRONIC INSTRUMENTS. IN SOME EXTREME CASES THIS ACTIVITY CAN TAKE A WEAPON SYSTEM OFF LINE FOR UP TO A WEEK. COMPOUNDING THIS PROBLEM, DURING THE PAST 10 YEARS, MILITARY ELECTRONIC INSTRUMENTATION IN THE FIELD HAS GROWN RAPIDLY, NOW TOTALING OVER 2 MILLION PIECES. THE SOPHISTICATION AND COMPLEXITY OF NEW DIGITAL AND PROGRAMMABLE INSTRUMENTS HAS STRAINED THE VERIFICATION/CALIBRATION CAPABILITY OF EVEN THE INSTRUMENT MANUFACTURERS AND HAS PLACED AN INTOLERABLE BURDEN ON INSTRUMENT USERS.

THIS CALIBRATION DILEMMA SET THE STAGE FOR INNOVATION. TAKING TWO INGREDIENTS: FIRST, RECOGNITION THAT VERIFICATION AND CALIBRATION WILL BECOME INCREASINGLY TIME CONSUMING AND COMPLEX; SECOND, RECOGNITION THAT THE STANDARD IEEE BUS MAKES AUTOMATIC CALIBRATION POSSIBLE: AND COMBINING THEM WITH A SET OF HIGHLY SKILLED AND MOTIVATED PERSONNEL, MARTIN MARIETTA ORLANDO AEROSPACE SET OUT TO DEVELOP WHAT TURNS OUT TO BE A ONE-OF-A-KIND CAPABILITY.

THIS CAPABILITY TO AUTOMATICALLY VERIFY/CALIBRATE ELECTRONIC INSTRUMENTS USING A HOST COMPUTER AND SATELLITE LINK-UPS, NOW EXISTS AND IS IMMEDIATELY APPLICABLE IN AT LEAST A SEMI-AUTOMATIC MODE, TO THE 2M INSTRUMENTS IN THE DEFENSE INVENTORY. THIS REMOTE CAPABILITY MEANS, FOR INSTANCE, THAT HARDWARE CAN BE CALIBRATED IN-PLACE WITH NO NEED TO ROTATE IT TO A DEPOT. THIS MEANS AT SEA, ON THE FLIGHT LINE OR ON THE FRONT LINE. WITH ALMOST ALL NEW SYSTEMS COMING EQUIPPED WITH THE IEEE BUS, THE FULLY AUTOMATIC MODE WILL EVEN FURTHER DECREASE FIELDED DOWNTIME.

AGAIN, A PERFECT EXAMPLE OF INNOVATION'S EFFECT ON UP-FRONT DESIGN AND THE RESULTING FIELDED BENEFITS.

III. PRODUCTION

SWITCHING GEARS NOW, LET'S TALK ABOUT PRODUCTION.

THE KEY TO SUCCESSFUL PRODUCTION IS PREVENTION OF ERROR. ERROR CAN BE INTRODUCED AT ANY POINT DURING PRODUCTION AND CAN OCCUR FOR A MULTITUDE OF REASONS, SOME SIMPLE AND SOME COMPLEX.

ONE SIMPLE REASON COMES TO MY MIND WHEN I RECALL ONE OF MY FIRST ENCOUNTERS WITH PRODUCTION FLOOR PERSONNEL, WHILE WORKING FOR A TRUCK MANUFACTURING COMPANY IN THE MID-WEST. I HAD SUCCESSFULLY CONVINCED THE ENGINEERS, DESIGNERS, AND MANAGERS TO INCLUDE RELIABILITY AND MAINTAINABILITY AS CO-EQUALS IN DESIGN WITH PAYLOAD AND COST. I THEN CONCENTRATED ON COLLECTING AND ANALYZING FIELD DATA, TO DETERMINE THE RESULTS OF THE NEW

DESIGN EMPHASIS, AND TO TRACK PROGRESS. IN DOING THIS, I QUICKLY FOUND OUT THAT SOMEWHERE BETWEEN WHAT THE ENGINEERS DESIGNED, AND WHAT THE CUSTOMERS RECEIVED, WE HAD SOME SIGNIFICANT SLIP-UPS OCCURRING. IT TURNED OUT THAT IN THIS NON-DEFENSE, HEAVY-IRON BUSINESS, I FOUND PRODUCTION WORKERS ACTUALLY CHANGING THE DESIGN ON THE SHOP FLOOR. THEY MADE THESE CHANGES BELIEVING THAT THE NEW DESIGN WAS IN ERROR, SINCE THEY HAD MADE SO MANY PARTS THE OLD WAY.

THIS EXPERIENCE RESULTED IN A "MAKE IT LIKE THE PRINT" CAMPAIGN.

IN OUR SOPHISTICATED, HIGH TECHNOLOGY DEFENSE INDUSTRIES, WE DON'T FIND MANY "MAKE IT LIKE THE PRINT" PROBLEMS, BUT WE DO HAVE OPPORTUNITIES TO MAKE VERY SUBTLE, BUT POTENTIALLY DEVASTATING ERRORS. SOMETIMES THESE ERRORS SHOW UP AS SCRAP, AND DECREASE OUR BANG FOR THE BUCK; SOMETIMES IT'S EVEN WORSE, THEY MAKE IT THROUGH OUR ELABORATE SYSTEM OF CHECKS AND BALANCES INTO THE HANDS OF THE USER.

CONSEQUENTLY, LIKE INNOVATION IN DESIGN, THERE IS A CONSTANT NEED TO CONTINUALLY IMPROVE PERFORMANCE IN THE PRODUCTION ARENA. WE AT MARTIN MARIETTA ORLANDO AEROSPACE, LED BY OUR PRESIDENT, ARE PLEDGING TO PRODUCE FOR OUR CUSTOMERS, RELIABLE AND DEFECT FREE PRODUCTS, WHICH MEET ALL REQUIREMENTS AT THE LOWEST POSSIBLE COST.

TO EMPHASIZE THE SERIOUSNESS OF THIS PLEDGE, OUR PRESIDENT HAS INSTITUTIONALIZED HIS THOUGHTS BY LAUNCHING A COMMITMENT TO EXCELLENCE PROCESS. THIS PROCESS EXTENDS TO EVERY ELEMENT OF THE COMPANY'S STRUCTURE. IT REVITALIZES AND MODERNIZES THE INCREDIBLY SUCCESSFUL ZERO DEFECTS PROGRAM THAT MARTIN MARIETTA ORLANDO AEROSPACE STARTED IN THE 60'S. OUR COMMITMENT TO EXCELLENCE PROCESS HAS ALL THE STRENGTHS OF ZD, FORTIFIED BY AN ADDITIONAL 20 YEARS OF COMPANY EXPERIENCE, AND BY A FEELING OF NEW EXCITEMENT COMING FROM THE YOUNGER PART OF THE WORK FORCE.

THIS PROCESS, LIKE A CAREFULLY DEVELOPED QUALITY ENGINEERING PROGRAM, IS A FORM OF PREVENTION. WITH TODAY'S SOPHISTICATION AND LARGE QUANTITY PRODUCTION RUNS, THIS KIND OF CAREFUL UP-FRONT PLANNING AND ENGINEERING IS REQUIRED TO MAXIMIZE QUALITY OUTPUT.

USING THE COMMITMENT TO EXCELLENCE PROCESS AND A DYNAMIC PRODUCT ASSURANCE DIRECTORATE, WE AT MARTIN MARIETTA ORLANDO AEROSPACE HAVE BEEN PUSHING VERY HARD IN 1983 TO ACHIEVE THE PROPER EMPHASIS ON PREVENTION AND PLANNING. WE'RE PROUD TO REPORT THAT WE ARE ACHIEVING SIGNIFICANT IMPROVEMENT. OUR YIELDS ARE STEADILY CLIMBING AND OUR DEFECTS/UNIT ARE STEADILY FALLING.

I'VE NOW COMPLETED MY DISCUSSION OF DESIGN AND PRODUCTION. I'VE PROVIDED SUPPORT FOR MY PREMISE THAT THROUGH INNOVATION IN DESIGN AND PREVENTION OF ERROR IN PRODUCTION, A SUCCESSFUL WEAPON SYSTEM IS DELIVERED TO THE CUSTOMER.

I AM NOW READY TO DISCUSS THE CUSTOMER AND HIS CONTRIBUTION TO INNOVATION AND PREVENTION OF ERROR.

IV. USER FRONT END PLANNING

I'D LIKE TO KEEP THIS PART OF TALK SHORT, SIMPLE, AND LIMIT IT TO THE USER'S REPRESENTATIVE, THE DEFENSE MANAGERS, BOTH IN AND OUT OF UNIFORM.

I THINK THERE ARE TWO PRIMARY WAYS THE MILITARY SERVICES CAN HELP INDUSTRY PROVIDE BETTER WEAPON SYSTEMS. SINCE THESE ARE MY OPINIONS, I WON'T TRY TO ELABORATE, I'LL JUST STATE THEM FOR YOUR CONSIDERATION.

FIRST: WORK TO MAKE SURE THAT FUNDS FOR INNOVATION IN DESIGN AND PREVENTION OF ERROR IN PRODUCTION ARE MADE AVAILABLE UP FRONT. I THINK THE BENEFICIAL LEVERAGING EFFECT OF THIS SMART MONEY MAKES IT WELL WORTH THE CONGRESSIONAL BATTLES OF REQUESTING AND DEFENDING.

SECOND: CONTINUE TO STRENGTHEN THE REQUIREMENTS DEFINITION CAPABILITIES WITHIN THE SERVICES. THIS UP-FRONT INVESTMENT ON THE PART OF THE SERVICES, WILL LIKEWISE PAY EXTREMELY HIGH DIVIDENDS IN THE FORM OF REDUCED FALSE STARTS, LOWER PROBABILITY THAT EQUIPMENT WILL BE OBSOLETE BEFORE IT IS FIELDED, AND LESS CHANCE OF NEEDLESS DUPLICATION OF CAPABILITIES.

V. SUMMARY

IN SUMMARY, THE KEY TO ACHIEVING EXPECTED ILS AND ASSURANCE SCIENCE SUCCESS IN EQUIPMENT DESIGN, IS THROUGH INNOVATION. THE KEY TO THE PRODUCTION OF RELIABLE, SUPPORTABLE EQUIPMENT, IS PREVENTION OF ERROR.

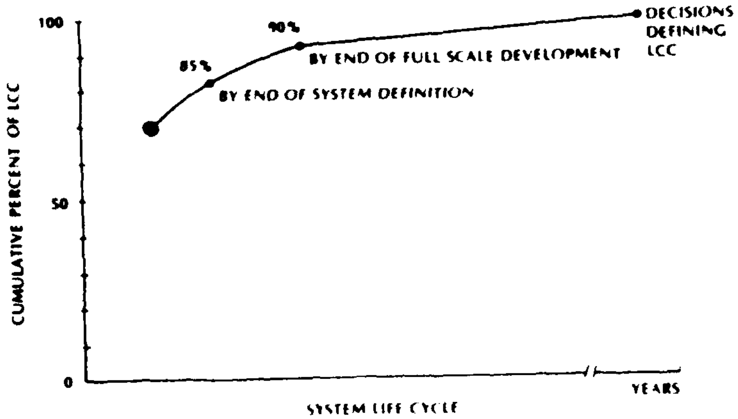
IN LIGHT OF CURRENT EVENTS, THE EYES OF THE WORLD ARE ONCE AGAIN FOCUSSED ON THE UNITED STATES AND ITS DEFENSE POSTURE. IT IS THEREFORE OF INCREASED IMPORTANCE THAT THE DEFENSE INDUSTRY PERFORM AT ITS PEAK, RECOGNIZING THE IMPORTANCE OF FRONT LOADING OUR IDEA AND PLANNING FACTORIES. LIKEWISE, IT IS OF EXTREME IMPORTANCE THAT THE MILITARY SERVICES SUPPORT INDUSTRY'S NEED FOR UP-FRONT INNOVATION AND PREVENTION OF ERROR IN MEETING THE CHALLENGE OF THE 80'S.

THANK YOU.

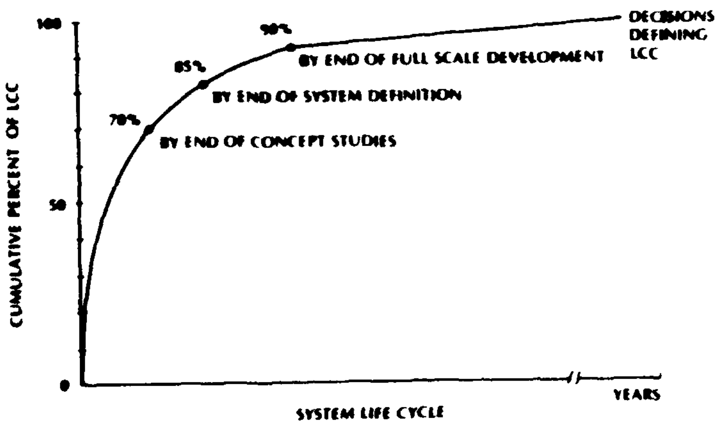
ILS AND PRODUCT ASSURANCE

- COMMUNICATION OF REQUIREMENTS AND LOGISTICS CONSTRAINTS
- INTEGRATION OF DESIGN AND LOGISTICS PLANNING
- RESOLUTION OF LOGISTICS PLAN WITH REALITY

LIFE CYCLE COST IN SYSTEM ACQUISITION



LIFE CYCLE COST IN SYSTEM ACQUISITION



IDA R&M STUDY MAJOR FINDINGS

- GROWTH AND MATURATION PROGRAMS
- DIAGNOSTICS DEVELOPMENT
- INFORMATION SYSTEMS

GROWTH AND MATURATION PROGRAMS

- TOTAL GROWTH PROGRAM NOT JUST TEST PHASE
- EXTENDING FROM FIRST TESTING INTO FIELD SERVICES
- PLANNED ENGINEERING SUPPORT AND CORRECTIVE ACTION RESOURCES

DIAGNOSTIC PROBLEMS

- HIGH CANNOT DUPLICATE AND RETEST OKAY
  - 30-45% MANHOURS, 30-70% EVENTS
  - IMPACTS READINESS, SPARES, MANPOWER, SKILL
- LACK OF DISCIPLINE, STRUCTURE
  - TERMS, DEVELOPMENT SCHEDULE, DEMONSTRATION
- LEADS TO "UNPLANNED" REQUIREMENT TO FIX AND MATURE
- DO NOT HAVE CREDIBLE PROGRAM TO MEET POTENTIAL

DIAGNOSTIC DEVELOPMENT

- DEVELOPMENT PROCESS IS IMMATURE
- LIMITED AND FRAGMENTED EXPERIENCE
- DIAGNOSTICS CONCEPT IS FUNDAMENTAL TO LOGISTICS CONCEPT AND LOGISTICS PLANNING
- MATURATION PROGRAMS REQUIRED

INFORMATION SYSTEMS

- MEET ORIGINAL INTENDED OBJECTIVES
- DO NOT

  PROVIDE BASIS FOR GROWTH AND MATURATION

  PROVIDE DIRECTION FOR TECHNOLOGY EFFORTS

  TAKE ADVANTAGE OF STATE-OF-THE-ART INFORMATION TECHNOLOGY

Session VIII

DEPARTMENT OF DEFENSE

CAPT. ANTHONY A. HASTOGLIS
NAVY DEPUTY JOINT TEST DIRECTOR
JLOTS II/CHIEF OF STAFF

JLOTS II ABSTRACT

A central precept of strategic mobility is the use of merchant ships to support the sealift requirements for deployment of supplies and equipment worldwide. Changes in the size and make-up of the U.S. Merchant Fleet in recent years have driven significant changes in the requirements for offloading these ships in the objective area. In particular, the expanded fleet of container and Roll-On/Roll-Off ships and their associated dependence on fixed port facilities requires that the services have the capability to offload these ships when port facilities are limited or non-existent.

The "over-the-shore" offload requirement has resulted in the development of new service systems and components for offloading all types of cargo in an austere environment. This equipment ranges from a completely new class of auxiliary crane ship to offshore bulk fuel delivery systems and includes items from Army, Navy and Marine Corps logistic systems. JLOTS II is an integrated test of all new and existing service equipment designed to support the over-the-shore delivery of cargo and is designed to evaluate them in coordinated use in a sustained logistics environment under weather conditions up to and including sea state 3.

The JLOTS II test objectives are as follows:

1. Assess the deployment capability of JLOTS equipment items.
2. Assess the resources for installation and operation of JLOTS equipment.
3. Assess service/joint capability to deliver cargo in sustained over-the-shore operations.
4. Assess service/joint capability to control cargo movement over-the-shore.
5. Assess the transition from Navy/Marine to Army over the shore operations.

The test results will provide information which can be used to validate and refine operational techniques, develop planning factors and resource requirements and provide the basis for determining deployment force support requirements in the future.

JLOTS II testing is organized in three phases. All tests will take place at Fort Story, Virginia.

Phase I, Deployment, is scheduled to take place in the summer of 1983 and is designed to address the question of transportability of the equipment necessary to conduct over the shore operations. This phase will include the loading of two specialized merchant ships (LASH and SEABEE) and the subsequent offshore offload of major JLOTS items. These ships are the only ships capable of handling much of the large and difficult to handle JLOTS equipment. This phase will provide valuable information on the preparation, loading and delivery procedures for these items.

Phase II, Roll-On/Roll-Off, is scheduled for the summer or fall of 1983 depending on ship charter availability. In this phase, two different types of RO/RO ships will be loaded with a large variety of representative military vehicles to test the installation and use of a new ramp and platform facility which permit offshore off load of the vehicles. The vehicles will be recycled several times to the shore to provide round-the-clock, sustained operations.

Phase III, Throughput, is scheduled to take place in the fall of 1984 and will be the most extensive phase of the test. Throughput operations will begin with the installation of shore systems and focus on sustained container and breakbulk cargo operations. Also, during this phase, the various service bulk fuel delivery and storage systems will be installed and operated. The containers and breakbulk cargo will be recycled to the respective ships to permit a total of nearly three weeks continuous operations. During the cargo operations, Navy/Marine and Army systems will be individually and jointly utilized and evaluated.

JLOTS II will be a unique test of the latest developments in service equipment assigned to address the critical capability to deliver cargo to deployed units where port facilities are limited or non-existent. The data derived from this test will provide the baseline for strategic sealift planning as well as providing valuable insights into service equipment capabilities and future support requirements.

JLOTS II

JOINT LOGISTICS OVER THE SHORE II
JLOTS II

JOINT TEST AND EVALUATION

1

JLOTS II

SEALIFT: CRITICAL ELEMENT
OF STRATEGIC MOBILITY

"WITHOUT ADEQUATE AND RELIABLE SEALIFT, NONE OF OUR MILITARY PLANS ARE EXECUTABLE."

ADMIRAL THOMAS B. HAYWARD
FORMER CNO

2

JLOTS II

TRENDS IN U.S. FLAG SHIPS

- FEWER IN NUMBER
- MORE SPECIALIZED
- LARGER CAPACITY

3

JLOTS II

US FLAG FLEET

	1970		1982	
NUMBER OF SHIPS	1579		853	
	GOVT	MERCHANT	GOVT	MERCHANT
	786	793	279	574
TOTAL CAPACITY (DWT)	21,300,000		24,400,000	

4

JLOTS II

IMPACT OF CHANGES ON STRATEGIC MOBILITY

- DECREASED NUMBERS OF US SHIPS FOR CONTINGENCIES
- INCREASED DEPENDENCE ON FIXED PORT FACILITIES
- DECREASED CAPABILITY TO DEPLOY UNIT EQUIPMENT
- INCREASED CAPACITY FOR RESUPPLY

5

JLOTS II

THE JOINT MILITARY REQUIREMENT FOR AN OVER THE SHORE LOGISTICS CAPABILITY

THE ABILITY TO DELIVER EQUIPMENT AND SUPPLIES FROM MERCHANT SHIPS TO DEPLOYED FORCES IN FORWARD AREAS WHERE PORT FACILITIES DO NOT EXIST OR ARE INADEQUATE

7

JLOTS II

FACTORS NECESSITATING AN OVER THE SHORE CAPABILITY

- OVER 90% OF TONNAGE FOR DEPLOYED FORCES WILL BE BY SEALIFT
- AVAILABILITY OF PORT FACILITIES MAY BE LIMITED OR NON-EXISTANT

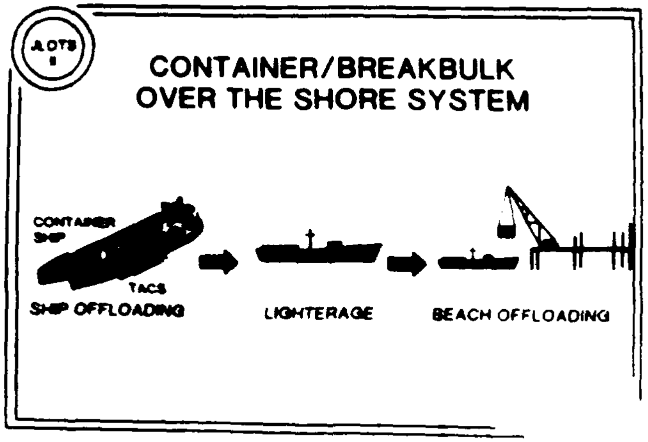
...THE LAST THREE MILES ARE CRITICAL AND MAY REQUIRE

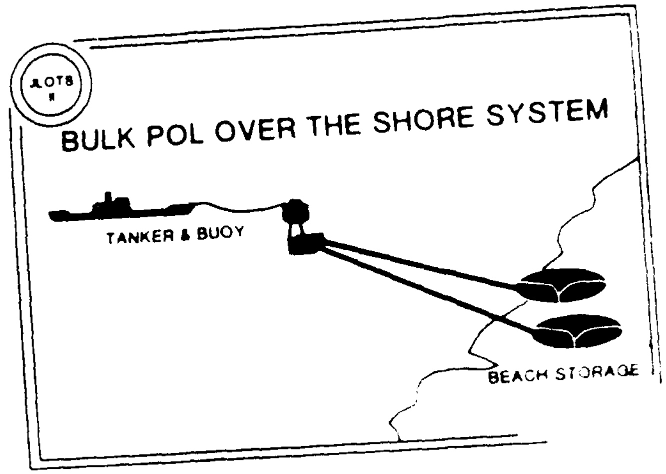
OVER THE SHORE OFFLOAD

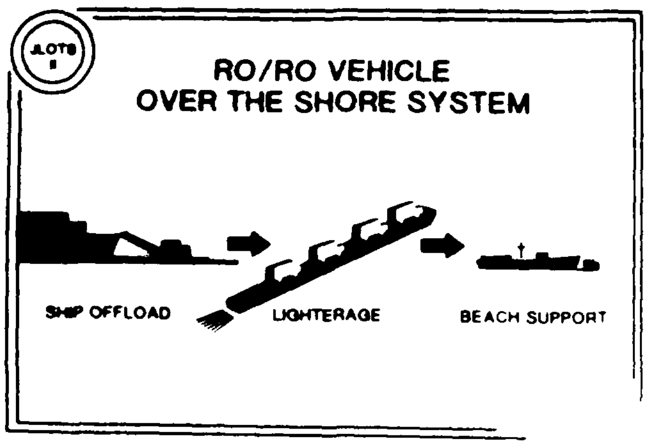
JLOTS II

CHARACTERISTICS OF OVER THE SHORE LOGISTICS OPERATIONS

- TEMPORARY, INEFFICIENT AND DIFFICULT
- IMMEDIATE AND SUSTAINED TONNAGE REQUIREMENTS
- SENSITIVE TO OFFLOAD/DELIVERY SYSTEMS
- REQUIRES DEPLOYMENT OF LARGE, SPECIALIZED AND SCARCE EQUIPMENT
- REQUIRES A NUMBER OF SHIPS TO DEPLOY THE EQUIPMENT
- SENSITIVE TO SEA STATE/BEACH CONDITIONS







TODAY's CAPABILITY IS LIMITED:

- CONTAINER SHIP OFFLOAD EQUIPMENT
- AVAILABILITY/POSITIONING OF EQUIPMENT
- DEPLOYABILITY OF EQUIPMENT

JLOTS II

JLOTS II IS AN <u>INTEGRATED</u> TEST OF SERVICE SYSTEMS AND EQUIPMENT ITEMS IN A SUSTAINED LOGISTICS ENVIRONMENT FOR THE PURPOSE OF ASSESSING AND ESTABLISHING THE FOLLOWING:

- OPERATIONAL TECHNIQUES AND PROCEDURES
- PLANNING FACTORS
- EQUIPMENT REQUIREMENTS
- PERSONNEL REQUIREMENTS

13

JLOTS II

JLOTS II TEST OBJECTIVES

1. ASSESS DEPLOYMENT CAPABILITY OF JLOTS EQUIPMENT
2. ASSESS RESOURCES FOR INSTALLATION AND OPERATION OF JLOTS EQUIPMENT
3. ASSESS SERVICE/JOINT CAPABILITY TO DELIVER CARGO IN SUSTAINED OVER THE SHORE OPERATIONS
4. ASSESS SERVICE/JOINT CAPABILITY TO CONTROL CARGO/CONTAINER MOVEMENT OVER THE SHORE
5. ASSESS THE TRANSITION FROM NAVY/MARINE TO ARMY OVER THE SHORE OPERATIONS

15

JLOTS II

TEST SCOPE

- LOAD AND DEPLOY JLOTS EQUIPMENT
- OFFLOAD AND INSTALL JLOTS EQUIPMENT
- THROUGHPUT FROM CONTAINER, BREAKBULK, TANKER, AND RO/RO SHIPS
- CONTROL CARGO FROM SHIPS TO MARSHALLING OR STORAGE AREAS

JLOTS II

TEST PHASES

I JLOTS EQUIPMENT DEPLOYMENT

II VEHICLE THROUGHPUT FROM RO/RO SHIP

III CARGO THROUGHPUT FROM CONTAINER/BREAKBULK SHIPS AND TANKER

JLOTS II

PHASE I
EQUIPMENT DEPLOYMENT

SPRING 1984
FORT STORY, VA

- PREPARATION
- LOAD LASH AND SEABEE SHIPS AT POE
- OFFLOAD OFFSHORE
- LASH BARGE OPERATIONS
- ELCAS OPERATIONS
- SERVICE TRAINING

7

JLOTS II

PHASE III
CARGO THROUGHPUT OPERATIONS

SEPTEMBER/OCTOBER 1984
FORT STORY, VIRGINIA

- INSTALL EQUIPMENT
- OFFLOAD CONTAINER/BREAKBULK SHIPS OFFSHORE
- DELIVER CARGO TO SHORE/MARSHALLING AREA
- INSTALL BULK POL SYSTEMS
- SERVICE AND JOINT OPERATIONS
- SEA STATE 3 OPERATIONS

23

JLOTS II

PHASE II
RO/RO VEHICLE THROUGHPUT

SUMMER - FALL 1983
FORT STORY, VA

TWO SHIP CONFIGURATIONS (With & Without Own Ramp)

- LOAD RO/RO SHIPS AT POE
- INSTALL DISCHARGE FACILITY OFFSHORE
- OFFLOAD SHIP OFFSHORE
- TRANSPORT VEHICLES TO BEACH AND MARSHALLING AREA

20

JLOTS II

NAVY EQUIPMENT

- AUXILIARY CRANE SHIP (TACS)
- RO/RO DISCHARGE FACILITY
- POWERED CAUSEWAY SECTION (PCS)
- ELEVATED CAUSEWAY (ELCAS)
- OFFSHORE BULK FUEL SYSTEM
- LIGHTERAGE (CAUSEWAY FERRY, LCU, LCM)

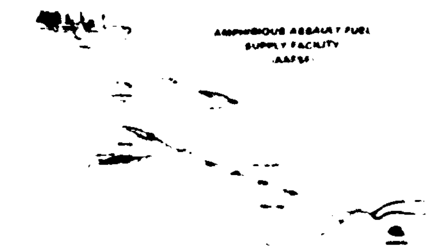
28

AUXILIARY CRANE SHIP (TACS)

- CONVERTED CONTAINER SHIP
- THREE INSTALLED CRANES
- SEA STATE 3 CAPABILITY

29

(JLOTS) II
JOINT TEST AND EVALUATION



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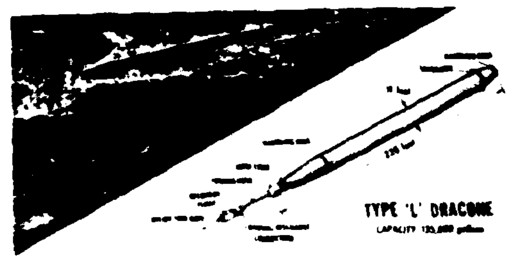
AUXILIARY CRANE SHIP (TAC)

(JLOTS) II
JOINT TEST AND EVALUATION



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JLOTS II

ARMY EQUIPMENT

- TEMPORARY CONTAINER DISCHARGE FACILITY (TCDF)
- BEACH CLEARANCE TRANSPORTERS
- DELONG PIER WITH CRANE
- MARSHALLING YARD OPERATIONS EQUIPMENT
- AUTOMATED CARGO DOCUMENTATION SYSTEM
- LIGHTERAGE (LACV-30, LARC, LCU)
- TACTICAL MARINE BULK POL TERMINAL SYSTEM

JLOTS II

JLOTS II APPLICATIONS

- STRATEGIC PLANNING
- FUTURE REQUIREMENTS
- SERVICE CAPABILITIES

COMMERCIAL UTILITY CARGO VEHICLE (CUCV)

PRESENTERS: Cal Schilling, Manager Zone Service Operations, Detroit Zone Office; Dave Patterson, Administrator, CUCV Operations, Cheverlot Motors Corporation

OBJECTIVES:

To demonstrate how the CUCV program meets the requisites of the Military Integrated Logistics Support System

To establish goodwill and garner support and favorable response to the CUCV program

To emphasize the fact that Chevrolet and General Motors care not only about sales, but about service, too!

(This is a two speaker presentation)

Cal and I are here to talk about the Commercial Utility Cargo Vehicle... or, the CUCV.

But before we do, I'm sure you're wondering why General Motors sent two of us here to talk to you.

No, it's not overkill...

...six months ago, Cal was the CUCV Administrator. He handled the first half of the contract and I'm responsible for the second half.

That's why there's two of us here...

I's like to give you a brief overview of General Motors. Dave and I work for the Chevrolet Division of General Motors. Chevrolet is the Division responsible for CUCV Service. Chevrolet is also number one in truck sales.

General Motors is the world's largest engineering and manufacturing organization with operations in thirty-seven countries.

Since its establishment in 1908, GM has been a leading producer of motor vehicles, and is also a diversified manufacturer with a product mix that includes integrated circuits, fiber optics, gas turbines, locomotives, navigational systems, and on and on.

From 1971 to 1980, GM produced over eighty million vehicles including annual production of more than a million trucks in six of those years. And since 1916, GM has sold over twenty-three million trucks.

The CUCVs are based on the very popular Chevrolet "C" and "K" Series Light-Duty Trucks. Pickups, Blazers and Chassis Cabs.

Since these trucks were introduced to the civilian market, more than seven million of them have been sold. Now that's more than any other single vehicle line in all of GM history!

And of those seven million, twenty-six percent -- almost two million of them -- have been 4-wheel drive models.

Certainly, all this experience in building trucks can provide the U.S. Military with durable and reliable products.

The goal of the CUCV program was to provide the Armed Forces with virtually an "off-the-shelf" commercial vehicle...

...as a c st-effective way to acquire and maintain...

...a large fleet of tactical, standard-mobility, light-duty vehicles.

The CUCV is a prime example of Military adaptation with slight modification of an existing, commercially available product. And the CUCV program is also a good example of the Integrated Logistics Support System at work.

The CUCV contract calls for 53,248 units with a 100 percent option. Additionally, General Motors is responsible for training, provisioning, providing logistics support analysis data on a quarterly basis, furnishing publications like operator and maintenance manuals, warranty implementation -- which, by the way, calls for an extended warranty for each vehicle, supplying repair parts and, in the U.S., the unique option of military self-service for warranty work or having a local Chevrolet dealer perform such work.

Obviously, we don't have dealerships in such places like Lebanon, El Salvador, Grenada, and so on...

Now let's take a look at what we term CUCV "challenges" since we don't have "problems" at General Motors -- only "challenges."

And the CUCV presented quite a few unique ones...

First and foremost was that of providing a commercial vehicle for Military use.

Then there are the stringent Military acceptance standards.

The automated General Motoars warranty system had to be geared to accept the Military maintenance request forms -- whibh are not automated.

Of course, there was the conversion of GM part numbers to national stock numbers and vice versa.

The implementation of a warranty program that provides the Military the option to perform warranty work, or for Cevrolet dealers to do it.

The obvious need for a top-notch warranty and technical assistance liaison force.

And there had to be some way to tie in the military to the GM parts acquisition process.

We'll breifly highlight how we met each of those "cha lenges" one at a time... of should I say we "mastered" each of those challenges?

I think "mastered"is the right word, Dave. Afterall, I had to handle the first phase of the contract. That's why you were left with everything running smoothly.

You know Cal, I've been meaning to talk to you about that...

Well, not right now Dave.. Let's move right along...

As we said, our first challenge was to provide a commercial vehicle for military use.

To begin with, we enlisted the support of the United Auto Workers at the Flint Assembly Plant.

By and large, they're a group of patriotic folks who display a surprisingly positive attitude, lots of pride and a fine spirit of cooperation.

In addition, we had to make special accommodations in our production process. For instance, while we offer two-tone paint on civilian trucks, we had to modify our assembly line paint procedures to achieve NATO camoflage standards.

There are also a number of unique parts that had to be added and changed from the civilian version. Like having two alternators instead of one, like mounting the batteries in a different location, and so forth.

To do all this, we had to thoroughly train production-line assemblers, inspectors and supervisors.

Meeting the stringent Military acceptance standards also provided us a unique opportunity. Obviously, by the very nature of defense and Military operations -- like ambulance work -- these vehicles have to be durable and dependable.

General Motros goal is to build the best product in the industry, whether it's a car, a truck or a Military vehicle. And General Motors vehicles meet or exceed government and industry standards for commercial, personal and recreational use.

But the Military requirements for performance and acceptance caused us to be even more intense on every aspect of this vehicle to assure the highest possible overall production quality. And one of the many things we did was to establish a special inspection station just off the assembly line devoted exclusively to CUCV quality assurance.

This one was a real challenge.. interfacing the GM automated warranty system with the Military system which is basically not automated. You could say it's a "stubby pencil drill".

We had to come up with a way to interface a DA form 2407 with our computer operations.

So, we established the CUCV "Warranty Clearinghouse" -- or CUCV Warranty Office where the Military claims are sent direct. Here a staff of people convert the Military handwritten forms to the GM automated system. All dealer claims are handled outside of the CUCV Warranty Office in the normal manner.

There's also a "toll-free" 800 telephone number for special assistance. Once the Military maintenance forms are put in the computer, we automatically trigger the replacement of warranty parts into the Military supply system.

Talk about integrated logistics, the computer additionally provides us with a quarterly report that categorizes repairs by location, type, expense or anything else those "logisticians" over at TACOM can come up with.

This one wasn't as easy as it might seem.

There are close to 5,000 parts in each CUCV. and each part, naturally, has a GM part number, but, since they are Military vehicles, each part also requires a national stock number. GM uses a six-part code, the Military uses a nine-part code. Illustrations and nomenclature are also different.

Well, it took us over a year to complete the complicated process of converting GM part numbers to national stock numbers and nomenclature, as well as adding S-M-R Codes, Usable-On Codes, and so on. Computer files were developed to build in cross-checks to help maintain a master parts record.

The special warranty program developed for the Military provides optimum flexibility. As stated earlier, the Military has the option to perform its own warranty work utilizing their on-base repair facilities or they could bring the CUCVs to a local dealer. In the beginning, this crated some special challenges for us.

What we worked out was a system whereby the Military -- through the CUCV Warranty Office -- receives future extended warranty deductible cost credits for all warranty work they do. In addition, replacement parts are automatically sent directly to the using units instead of some centralized warehouse.

Or, the Military can simply have any of the more than 5,000 Chevrolet dealerships nationwide perform warranty work. This system allows using units complete maintenance and flexibility without any compromise.

With all these new systems, part numbers, quality control standards and over 50,000 vehicles to deliver, there was a need for a group of field people to provide CUCV warranty and technical assistance.

However, Chevrolet was ready for this one. A force of professionals was already in place. They were busy answering the needs of our nation's commercial fleet users. These Chevrolet people are titled fleet service managers and are very capable of helping the Military identify, order and stock parts. They also assist units and installations in receiving new vehicles. They provide advice, counsel and liaison between the Military and Chevrolet.

I'd like to add that these fleet service managers are highly experienced and trained people -- possibly, they're the best service minds in the automotive industry, period. Without question, they perform duty above and beyond what the contract calls for.

I'm sure as U.S. taxpayers, we are all very sensitive to what happens when the Military goes shopping for repair parts. Recently, the newspapers have been filled with incredible stories of the Military having to pay extraordinary costs for parts. This often defies rational thinking.

Well, out-of-warranty parts can be ordered right through normal Military channels, using national stock numbers. Or, in emergencies, they can be purchased direct from local Chevy dealers. Either way, the Military gets competitive commercial rates.

That concludes our overview of CUCV- associated challenges and opportunities.

We at Chevrolet and General Motors are proud to be involved with the U.S. Army Tank Automotive Command on the CUCV program. We feel this program meets not just the letter of the contract, but also the spirit of the Integrated Logistics Support System.

The spirit of cooperation that helps achieve the goal of providing the Army, Navy, Air Force and Marine Corps with an "off-the-shelf" commercial vehicle as a cost-effective way to acquire and maintain a large fleet of tactical, standard-mobility, light-duty vehicles.

On behalf of General Motors, Chevrolet and Cal, I'd like to thank all of you for the opportunity to share our CUCV experiences here today. We've certainly learned a lot during our involvement in the CUCV program.

Another thing we've learned form the good folks at DARCOM is that each action leads to an effect, but the probabilities, or perhaps even the outcomes, are unknown.

Uncertainties may be further classified as things you don't know and things you don't know you don't know.

But believe me, we're learning.

And we love the experience.

At Chevrolet and General Motors,we care about the CUCV program, and, frnakly, we appreciate the business.

This concludes our presentation.

Thank you.

H.M. ORRELL
LOGISTICS MANAGEMENT EVALUATION AGENCY DCS/LOGISTICS
DEPARTMENT OF THE ARMY

USALEA PRESENTATION

TO

ADPA ILS SYMPOSIUM 1DEC 1983

Chart 1 on-(LEA LOGO)

GOOD AFTERNOON, IT IS WITH A GREAT DEAL OF PLEASURE AND HUMBLENESS THAT I COME BEFORE SUCH A GROUP OF EXPERTS IN INTEGRATED LOGISTICS SUPPORT, I DO NOT PRETEND TO BE AN EXPERT ONLY THE BEARER OF INFORMATION CONCERNING THE ROLE THAT THE UNITED STATES ARMY LOGISTICS EVALUATION AGENCY PLAYS IN ASSURING ILS IS ACCOMPLISHED ON ARMY ACQUISITIONS. MY BRIEFING ON ILS MANAGEMENT IS DESIGNED TO PROVIDE YOU WITH A BRIEF INSIGHT OF WHAT WE IN THE ARMY HAVE ESTABLISHED AS THE INDEPENDENT LOGISTICIAN USING THE UNITED STATES ARMY LOGISTICS EVALUATION AGENCY LOCATED AT THE NEW CUMBERLAND ARMY DEPOT,NEW CUMBERLAND PA. I WILL SHOW HOW LEA FITS INTO THE ARMY'S MANAGEMENT STRUCTURE, HOW WE VIEW OUR ILS MISSION AND THE METHODOLOGY WE EMPLOY TO SATISFY OUR REGULATORY REQUIREMENTS ESTABLISHED IN VARIC S ARMY REGULATIONS.

Chart 1 off
Chart 2 on

United States Army

LEA

LOGISTICS EVALUATION AGENCY

Chart 2 (LEA'S location in the materiel acquistion organization)

PORTRAYED HERE ARE SOME OF THE MORE IMPORTANT US ARMY ORGANIZATIONS THAT ARE INVOLVED WITH MATERIEL ACQUISITION. THIS IS NOT THE COMPLETE LISTING MY PURPOSE IS SIMPLY TO SHOW WHERE LEA FITS INTO THE ARMY STRUCTURE. AS A DESIGNATED FIELD OPERATING AGENCY WE REPORT DIRECTLY TO THE DEPUTY CHIEF OF STAFF FOR LOGISTICS AT DEPARTMENT OF ARMY. THE OTHER ARMY STAFF OFFICES, MAJOR ARMY COMMANDS AND OTHER ARMY ACTIVITIES SHOWN ALL PLAY A ROLE IN THE ACQUISTION PROCESS INTO WHICH LEA HAS TO INTERFACE TO BE ASSURED THAT THE INDEPENDENT LOGISTICIANS ROLE IS FULFILLED.

Chart 2 off

Chart 3 on

USA MATERIEL ACQUISITION ORGANIZATIONAL RELATIONSHIPS

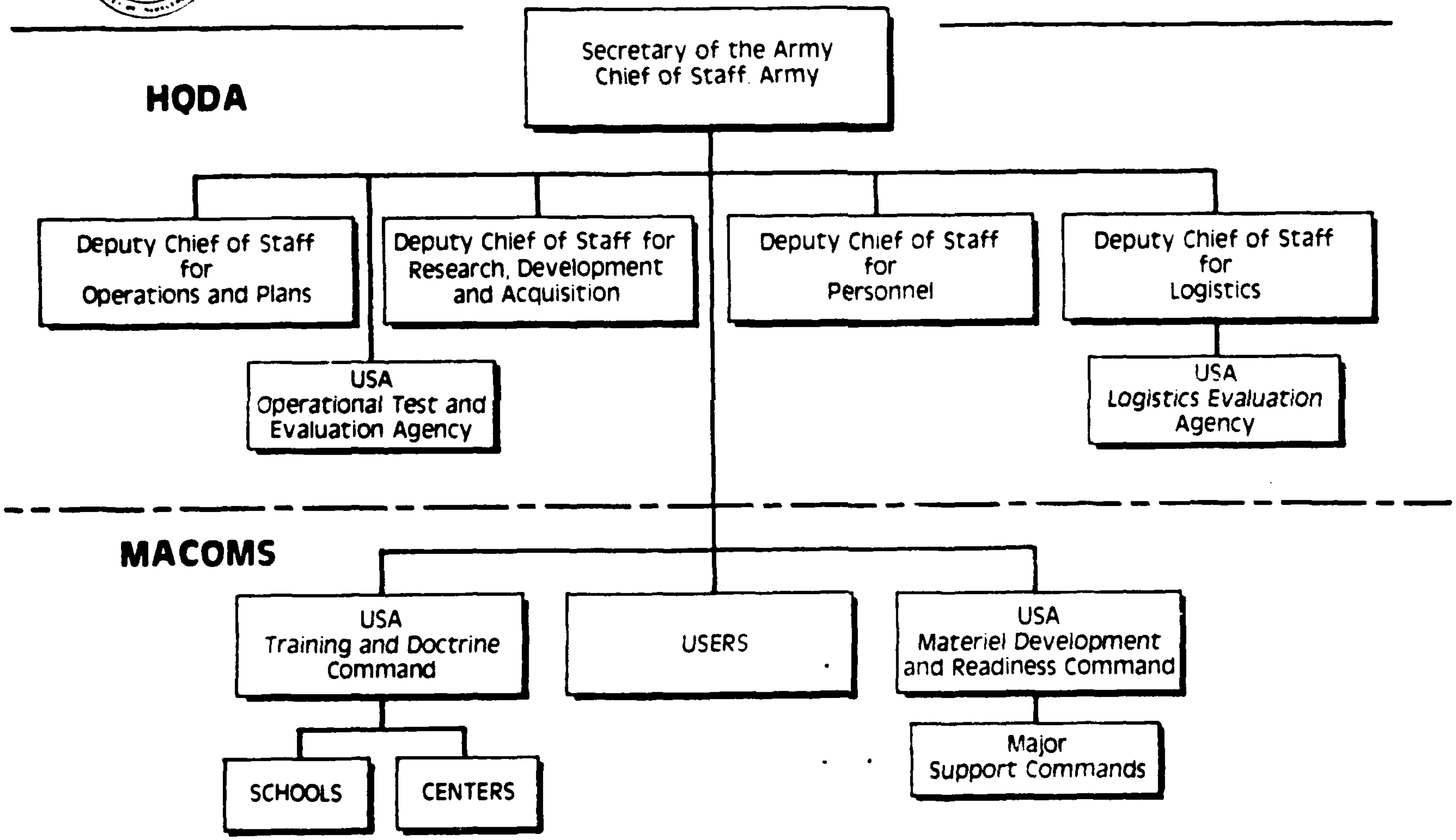

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Chart 3(LEA Structure)

THE U.S. ARMY LOGISTICS EVALUATION AGENCY NOW ORGANIZED AS SHOWN WAS ESTABLISHED AS A RESULT OF FINDINGS BY A HQ DEPARTMENT OF ARMY BOARD OF INQUIRY ON THE ARMY LOGISTICS SYSTEM IN 1967. THE BOARD CONCLUDED THAT DA DCSLOG INFLUENCES WERE LACKING IN THE MATERIEL ACQUISTION PROCESS, AND THAT IN PROCESS REVIEWS AND TESTING WERE NOT RESPONSIVE TO LOGISTICS REQUIREMENTS. RESULTING RECOMMENDATIONS WERE TO INCREASE DA DCSLOG PARTICIPATION IN ILS, ESTABLISH A DA DCSLOG AGENCY TO BE RESPONSIBLE FOR SURVEILLANCE OF LOGISTICS SUPPORT, PARTICIPATE IN TEST PLANNING AND EVALUATION AND PARTICIPATE AS THE LOGISTICIAN MEMBER AT IPRs. USALEA WAS GIVEN OTHER MISSIONS TO ASSESS THE TOTAL LOGISTICS READINESS AND SUSTAINABILITY OF THE ARMY, EVALUATE THE LOGISTICS ASPECTS OF CONTINGENCY PLANS AND FORCE STRUCTURE, AND PROVIDE TECHNICAL GUIDANCE ,PROCEDURES, AND ASSISTANCE TO THE ARMY IN ITS EXECUTION OF POLICY, DIRECTIVES AND GUIDANCE ISSUED BY DA DSCLOG.

Chart 3 off

Chart 4 on

AD A151 676 PROCEEDINGS OF THE INTEGRATED LOGISTICS SUPPORT SYMPOSIUM HELD AT FORT WO..(U) AMERICAN DEFENSE PREPAREDNESS ASSOCIATION ARLINGTON VA 02 DEC 83

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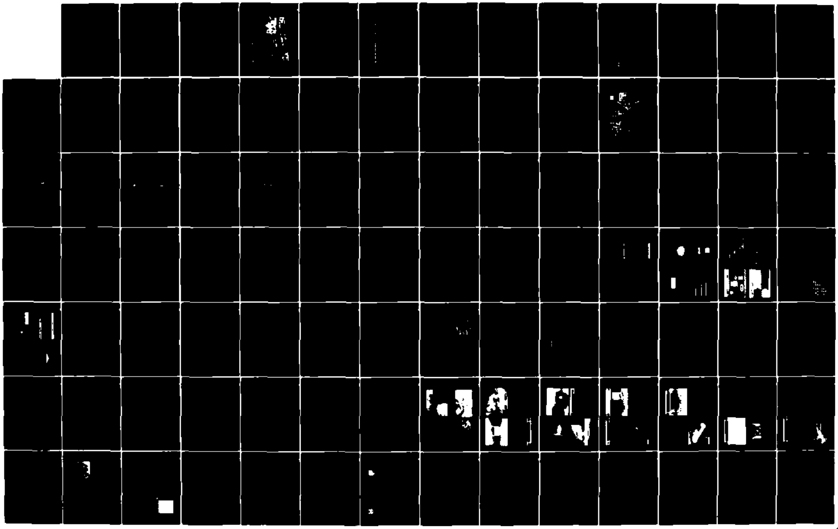

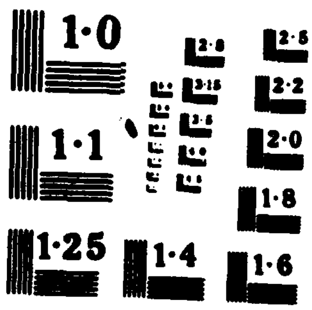
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United States Army
LOGISTICS EVALUATION AGENCY
Organization

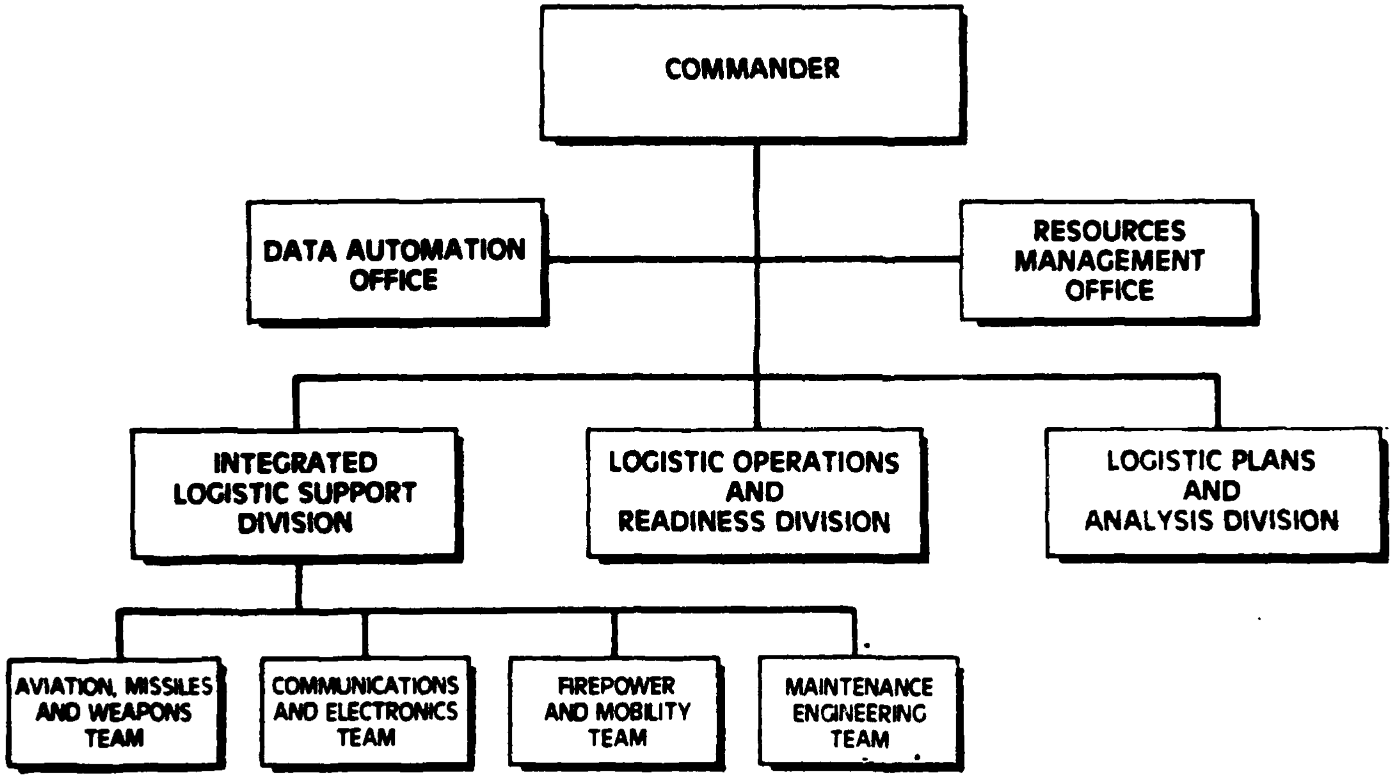


Chart 4 (LEI Mission showing systems)

IT IS NECESSARY TO EXPAND ON THE MISSION STATEMENT TO SET THE STAGE FOR WHAT THE INDEPENDENT LOGISTICIAN IS DESIGNED TO DO. AS THE INDEPENDENT LOGISTICIAN RESPONSIBLE FOR INTEGRATED LOGISTICS SUPPORT PROGRAM SURVEILLANCE AND EVALUATION IN THE MATERIEL ACQUISTION PROCESS, LEA OPERATES OUTSIDE THE LIMITATIONS ON THE MATERIEL DEVELOPER, COMBAT DEVELOPER, TRAINER AND USER REPRESENTATIVE. THE ILS DIVISION IN LEA IS INVOLVED WITH OVER 800 NEW OR PRODUCT IMPROVED SYSTEMS. THESE RANGE FROM LARGE, HIGH VISIBILITY , HIGH UNIT COST SYSTEMS SIMILIAR TO THOSE SHOWN HERE TO THE LESS GLAMOROUS BUT ESSENTIAL EQUIPMENT SUCH AS TRUCKS, INDIVIDUAL WEAPONS, CLOTHING ITEMS, GENERATORS AND RADIOS. THE TERM " INDEPENDENT LOGISTICIAN" IS UNIQUE TO THE MATERIEL ACQUISTION PROCESS AND IS DEFINED ON THE NEXT CHART.

Chart 4 off

Chart 5 on

United States Army
LOGISTICS EVALUATION AGENCY

INTEGRATED
LOGISTIC SUPPORT
DIVISION

ASSOCIATED MISSION

Serve as the independent logistician in the materiel acquisition process.

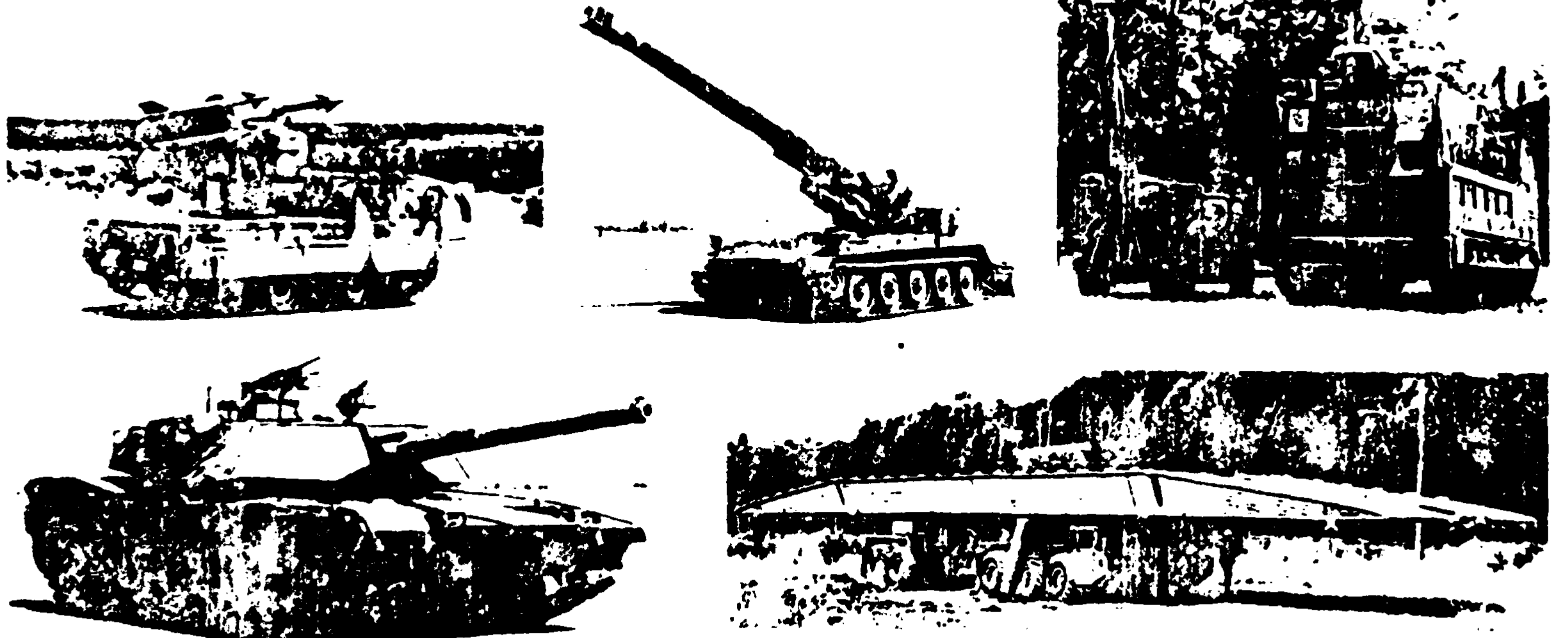


CHART 4

Chart 5 Independent Logistician)

THERE ARE SEVERAL KEY POINTS TO BE MADE WITH REGARD TO THIS DEFINITION. FIRST, THE INDEPENDENT LOGISTICIAN DOES NOT ESTABLISH THE REQUIREMENT,DEVELOP, OR PROVIDE TRAINING FOR THE ITEMS IN THE ACQUISTION CYCLE. SECONDLY, HE DOES NOT GET DIRECTLY INVOLVED WITH PROVIDING THE ACTUAL LOGISTICS SUPPORT, HOWEVER HE IS RESPONSIBLE FOR THE SURVEILLANCE AND EVALUATION NECESSARY FOR HIM TO PARTICIPATE DIRECTLY IN THE DECISION PROCESS THAT RESULTS IN PLACING NEW OR IMPROVED ITEMS IN THE HANDS OF THE USERS. THE ABOVE DEFINITION LEADS SOME TO CALL HIM AN HONEST BROKER OR AS I AM SURE SOME HAVE THE IMPRESSION THAT WE ARE NOTHING BUT A BUNCH OF OVERPAID ARMY POLICEMAN MAKING THINGS MISERABLE FOR ANYONE THAT DOES NOT HAVE THEIR ILS IN PLACE WHEN THE HARDWARE IS READY FOR ISSUE.

Chart 5 off

Chart 6 on

INTEGRATED LOGISTIC SUPPORT DIVISION

THE INDEPENDENT LOGISTICIAN

A command or agency other than the developer, combat developer, trainer, or user representative responsible for ILS program surveillance and evaluation in the materiel acquisition process.

CHART 5

Chart 6 LEA'S participation in functions relating to ILS.

SOURCE DATA FOR OUR ASSESSMENTS IS DERIVED FROM DIRECT INVOLVEMENT WITH THE MATERIEL ACQUISTION ACTIVITIES SHOWN HERE. SOME EXAMPLES ARE: EVALUATION OF DRAFT MATERIEL REQUIREMENT DOCUMENTS AS TO THE ADEQUACY OF THE PLANNED LOGISTICAL SUPPORT. THESE INCLUDE BUT ARE NOT LIMITED TO DOCUMENTS SUCH AS REQUIRED OPERATIONAL CAPABILITY (ROC) LETTERS OF AGREEMENTS (LOA) LETTER REQUIREMENTS (LR) TRAINING DEVICE REQUIREMENTS (TDR) AND JOINT SERVICE OPERATIONAL REQUIREMENTS (JSOR). WE ALSO EVALUATE PROGRAM MANAGEMENT PLANS(PMP),ILS PLANS, CONTRACTS AND SOLICITATION DOCUMENTS,AND MATERIEL FIELDING PLANS (MFP). THE TOTAL SPECTRUM OF TEST PLANNING DOCUMENTS ARE EVALUATED TO INSURE THAT THAT SUPPORTABILITY RELATED TEST ISSUES ARE WELL IDENTIFIED. TO A LIMITED EXTENT AS RESOURCES ALLOW WE MONITOR DIRECTLY DEVELOPMENT AND OPERATIONAL TESTS, MAINTAINABILITY DEMONSTRATIONS, PHYSICAL TEARDOWNS, AND OTHER TESTS USED TO PROVE ADEQUACY OF DEVELOPMENTAL AND NON-DEVELOPMENTAL MATERIEL. ONCE TESTING HAS BEEN COMPLETED THE DOCUMENTATION CONTAINING TEST RESULTS BECOME PRIMARY SOURCE INFORMATION TO AID IN PREPARATION OF OUR ASSESSMENTS. TO MAINTAIN CONTINUITY IN ACQUISTION PROGRAMS WE PARTICIPATE IN MANY OF THE MEETINGS AND REVIEWS SHOWN IN THE CENTER OF THE CHART.

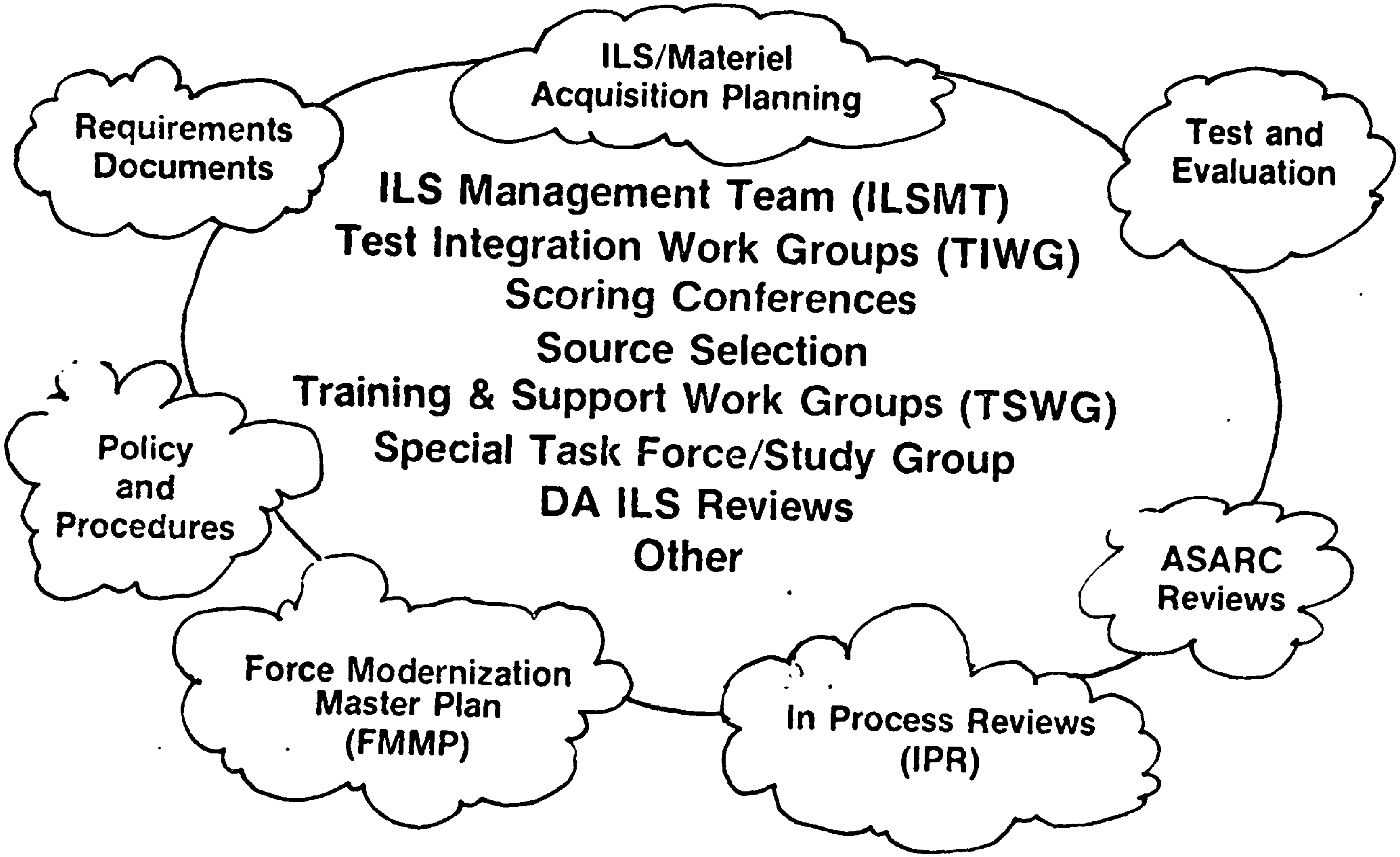
Chart 6 off

Chart 7 on

United States Army Logistics Evaluation Agency

ILS DIVISION

MAJOR FUNCTIONS



6

Chart 7 Display of 15 elements)

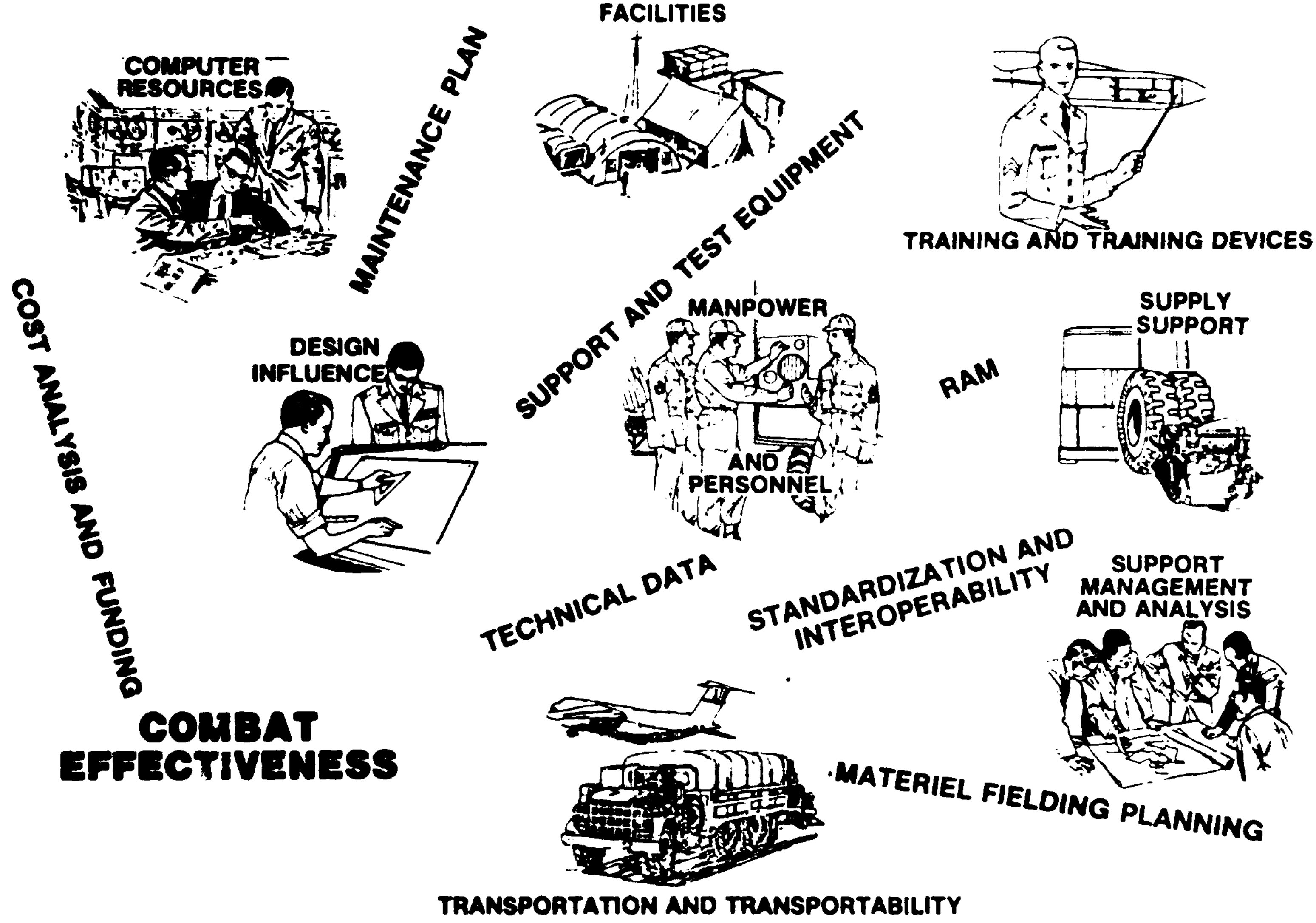
TO REACH AN ADEQUACY DECISION WE EVALUATE ILS IN ALL PHASES OF THE ACQUISTION CYCLE AND USE THE 15 ELEMENTS DISPLAYED HERE TO FORM THE BASIS FOR OUR ASSESSMENTS. WE BELIEVE THESE ELEMENTS TO BE THE IMPORTANT FUNCTIONS THAT CONTRIBUTE TO THE SUCCESS OF ANY SYSTEM ENTERING THE ARMY. ANYONE CAN ARGUE WITH THE RELATIVE IMPORTANCE OF ANY ONE ITEM AND BASED ON THEIR POSITION IN THE ACQUISTION PROCESS PRIORITIZE THEM TO SUIT THEIR REQUIREMENTS. HOWEVER ANY ONE ELEMENT CAN IN FACT CAUSE A SYSTEM TO BE NONSUPPORTABLE AND FAIL THE USER WHEN HE TAKES IT INTO COMBAT.

THE QUESTION SHOULD NOW COME TO MIND, WHAT DOES LEA LOOK FOR IN APPLYING EACH ELEMENT TO THE MANY SYSTEMS. THE NEXT SERIS OF CHARTS WILL PROVIDE A BRIEF MENU AND THEN WE WILL LOOK AT THE ESSENTIAL ELEMENTS OF INFORMATION WE USE TO DETERMINE THE ADEQUACY OF ONE OF THE 15 ELEMENTS.

Chart 7 off

chart 8 on

INTEGRATED LOGISTIC SUPPORT



Charts 8,9,10 (Definitions of lements)

Note: Put on #8 long enough to read,place next two on using same technique.I will continue to talk.

DEFINITIONS SHOWN HERE AND ON THE NEXT TWO CHARTS PROVIDE A BRIEF SUMMARY OF THE KIND OF THINGS THAT LEA's ACTION OFFICERS MUST CONSIDER IN MAKING SUPPORTABILITY DETERMINATIONS. ALL SYSTEMS DO NOT NECESSARILY REQUIRE A DETAILED EXAMINATION OF EACH ELEMENT HOWEVER FROM EXPERIENCE GAINED WITH MANY ASSESSMENTS WE SELDOM FIND A SYSTEM THAT HAS CONSIDERED EVERYTHING THAT WE REQUIRE TO ASSURE ADEQUATE SUPPORT AT THE TIME OF SCHEDULED FIELDING. I DO NOT INTEND TO DWELL ON EACH DEFINITION ONLY WISH TO EMPHASIZE DUE TO THE MANY UNIQUES BUILT INTO ALL ACQUISTIONS NO ONE ELEMENT CAN BE CONSIDERED THE MOST IMPORTANT TO THE INDEPENDENT LOGISTICIAN, THEY ALL MUST BE EVALUATED TO REACH A SUPPORTABILITY DECISION.

Chart 10 off

Chart 11 on

Assessment Elements

ILS DEFINITIONS/CONSIDERATIONS

1. **MAINTENANCE PLAN.** Levels, tasks, Operational Readiness Float, contractor support, requirements to restore and sustain system in operational ready condition.

2. **SUPPORT AND TEST EQUIPMENT.** Tools, test, measuring and diagnostic equipment, automatic test equipment, common and peculiar associated items of equipment (i.e., trucks, generators).

3. **SUPPLY SUPPORT.** Provisioning, acquisition, cataloging, packaging, preservation, handling, storage, issue and disposal of principal and secondary items.

4. **TRANSPORTATION AND TRANSPORTABILITY.** Requirements/design considerations for system transport, inter- and intra-theater; demonstrations.

5. **TECHNICAL DATA.** Technical manuals, test data, drawings, specifications, standards, reports, tabular data, logistic support analysis record, depot maintenance work requirements.

Assessment Elements

ILS DEFINITIONS/CONSIDERATIONS

6. **MANPOWER AND PERSONNEL.** Numbers, skills, grades, safety, environment, military occupational specialty, human factors, man-machine interface, impact.

7. **TRAINING AND TRAINING DEVICES.** Development of skills required to operate and maintain the system, initial introduction, support of training devices.

8. **FACILITIES.** Operation, training and support construction requirements; firing ranges, roads, hardstand, shops, etc.

9. **COMPUTER RESOURCES.** Hardware, software, interfaces, post-deployment software support, test program sets.

10. **MATERIEL FIELDING PLANNING.** Letter of notification, materiel fielding plan, mission support plan, materiel fielding team, materiel fielding agreement, statement of support.

Assessment Elements

ILS DEFINITIONS/CONSIDERATIONS

11. **DESIGN INFLUENCE.** System readiness objective, minimize manpower and skills, minimize life cycle cost, built-in-test equipment, source selection, testing feedback.

12. **STANDARDIZATION AND INTEROPERABILITY.** System-family approach, off-the-shelf components/sub-systems, interface with services, other units, NATO allies.

13. **RAM.** Goals, thresholds relating to manpower and support costs; readiness relationship, test results/impacts, growth.

14. **SUPPORT MANAGEMENT AND ANALYSIS.** Integrated Logistic Support plan, sample data collection, operational test data, coordination, logistic support analysis, configuration management, manpower and logistics analysis, test plans.

15. **COST ANALYSIS AND FUNDING.** ILS cost estimates, ILS management resources, adequacy, availability, timeliness, cost and operational effectiveness analysis.

Chart 11 (Example of essential elements of information necessary to determine adequacy of support and test equipment)

REPRESENTED HERE IS AN EXAMPLE OF THE TYPE OF INFORMATION REVIEWED TO DETERMINE HOW ADEQUATE SUPPORT AND TEST EQUIPMENT IS FOR THE SYSTEM BEING ACQUIRED. EACH ELEMENT HAS A SIMILIAR SCHEMATIC THAT IS IN CONSTANT DEVELOPMENT TO KEEP UP WITH THE MANY VARIATIONS THAT OCCUR IN MELDING THE SUPPORT TO THE END ITEM BEING PROCURED. PLANS ARE UNDERWAY TO CONSOLIDATE OUR ESSENTIAL ELEMENTS OF INFORMATION INTO A PUBLICATION THAT WILL BE AVAILABLE AT A LATER DATE. I HAVE DWELLED CONSIDERABLY ON HOW THE EVALUATION PROCESS IS PURSUED, NOW TO THE RATING SYSTEM WHICH ON MANY OCCASIONS PLACES LEA IN THE UNFORTUNATE ROLE OF AN ADVERSARY BECAUSE IT IS VERY DIFFICULT TO AGREE ON RATINGS.

Chart 11 off

Chart 12 on

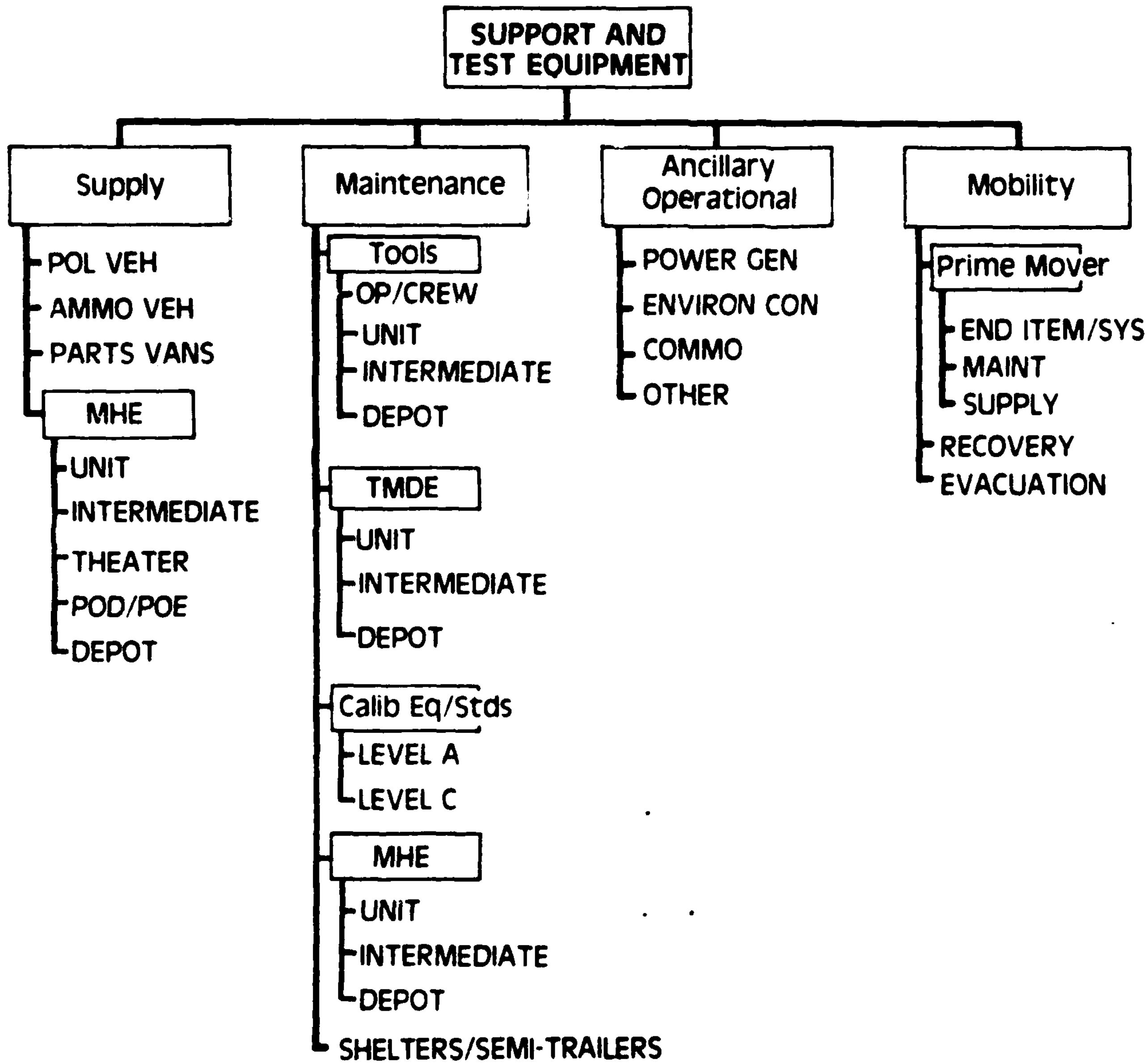

SUPPORT AND TEST EQUIPMENT
Supply
POL VEH
AMMO VEH
PARTS VANS
MHE
UNIT
INTERMEDIATE
THEATER
POD/POE
DEPOT
Maintenance
Tools
OP/CREW
UNIT
INTERMEDIATE
DEPOT
TMDE
UNIT
INTERMEDIATE
DEPOT
Calib Eq/Stds
LEVEL A
LEVEL C
MHE
UNIT
INTERMEDIATE
DEPOT
SHELTERS/SEMI-TRAILERS
Ancillary Operational
POWER GEN
ENVIRON CON
COMMO
OTHER
Mobility
Prime Mover
END ITEM/SYS
MAINT
SUPPLY
RECOVERY
EVACUATION

Chart 12 (Assessment summary)

UPON COMPLETION OF OUR DETAILED ASSESSMENT WE ESTABLISH A SYSTEM RATING USING A SUMMARY CHART SHOWN HERE. THE RATINGS, RED, GREEN, AND AMBER REFLECT THE SEVERITY OF THE PROBLEMS ASSOCIATED WITH EACH ELEMENT. THIS CHART WITH SUPPORTING DOCUMENTATION IS USED IN DECISION REVIEWS AS ONE COMPONENT IN DETERMINING THE RISK OF RELEASING THE SYSTEM FOR CONTINUED DEVELOPMENT OR PRODUCTION DEPENDING ON WHAT PHASE OF THE ACQUISTION PROGRAM THE SYSTEM HAS REACHED. THE CRITERIA USED TO REACH EACH RATING IS EXPLAINED ON THE NEXT CHART.

Chart 12 off

Chart 13 on

Integrated Logistic Support

SYSTEM

Supportability Assessment

LEGEND

- (R) Significant Problem
- (A) Minor Problem
- (G) Under Control

Assessment Elements	Rating
1. Maintenance Plan	◯
2. Support and Test Equipment	◯
3. Supply Support	◯
4. Transportation and Transportability	◯
5. Technical Data	◯
6. Manpower and Personnel	◯
7. Training and Training Devices	◯
8. Facilities	◯
9. Computer Resources	◯
10. Materiel Fielding Planning	◯
11. Design Influence	◯
12. Standardization and Interoperability	◯
13. RAM	◯
14. Support Management and Analysis	◯
15. Cost Analysis and Funding	◯

Chart 13 (criteria)

THE CRITERIA IS PRETTY MUCH SELF EXPLANATORY, HOWEVER IF YOU WILL PAY CLOSE ATTENTION TO THE SHORT SENTENCE ON THE BOTTOM YOU WILL HAVE A CLEARER UNDERSTANDING WHY LEA SOMETIMES FINDS ITSELF IN THE SITUATION THAT I WILL SHOW LATER. FOR EXAMPLE AT IN PROCESS REVIEWS THAT THE INDEPENDENT LOGISTICIAN HAS TO CAST A VOTE ON WHETHER THE PROGRAM CAN CONTINUE WE FIND MANY TIMES THAT THE HARDWARE IS BUILT , THE NEED STATEMENT MAY BE SATISFIED BUT THE LOGISTICS IS EITHER LATE OR NOT PROPERLY PLANNED AND PORTRAYED AS SUCH WITH A MULTITUDE OF RED RATINGS VIVIDLY DISPLAYED BY THE LEA ASSESSMENT. THIS BRINGS OUT THE WORST IN IPR CHAIRMANS.

Chart 13 off

Chart 14 on(No discussion, pause then put on chart 15.

ILS ASSESSMENT CRITERIA

R Significant problem with no solution identified,
or
Solution being implemented with less than satisfactory results projected by fielding date.

A Significant problem with solution expected by IOC,
or
Minor problem with or without solution.

G No problem.

"If in doubt, assign the more pessimistic rating."
(LTG R. H. THOMPSON)

Chart 15(T C)

WHAT THE INDEPENDENT LOGISTICIAN HAS BEEN SEEKING DURING ALL THE EVALUATION PROCESS IS TO REACH SOMETHING WE CALL TYPE CLASSIFICATION. FROM THE DEFINITION IT IS READILY APPARENT THAT WHEN THE SYSTEMS REACH THIS MILESTONE THE ILS SHOULD BE COMPLETE AND THE USER HAS HIS LOGISTICS IN PLACE. IN MANY INSTANCES THE FUN JUST BEGINS BECAUSE ALTHOUGH THE PREREQUISITES LISTED HERE HAVE BEEN MET AVAILABILITY RATES CAN'T BE MET AND ILS MANAGEMENT IS CLEARLY AT FAULT BECAUSE OF LACK OF ATTENTION TO EACH OF THE 15 ELEMENTS THAT I HAVE ADDRESSED TODAY.

Chart 15 off

Chart 16 on

TYPE CLASSIFICATION STANDARD

DEFINITION— Item determined to be acceptable for mission intended, supportable in its intended environment, and acceptable for introduction into Army inventory; or which is capable of being made acceptable without further development effort, during production.

PREREQUISITES—

- Approved requirements document
- HQDA approved basis of issue plan and qualitative and quantitative personnel requirements information
- ASARC for major items or IPR for nonmajor items
- US Army Central TMDE Activity approval for acquisition of test, measuring and diagnostic equipment

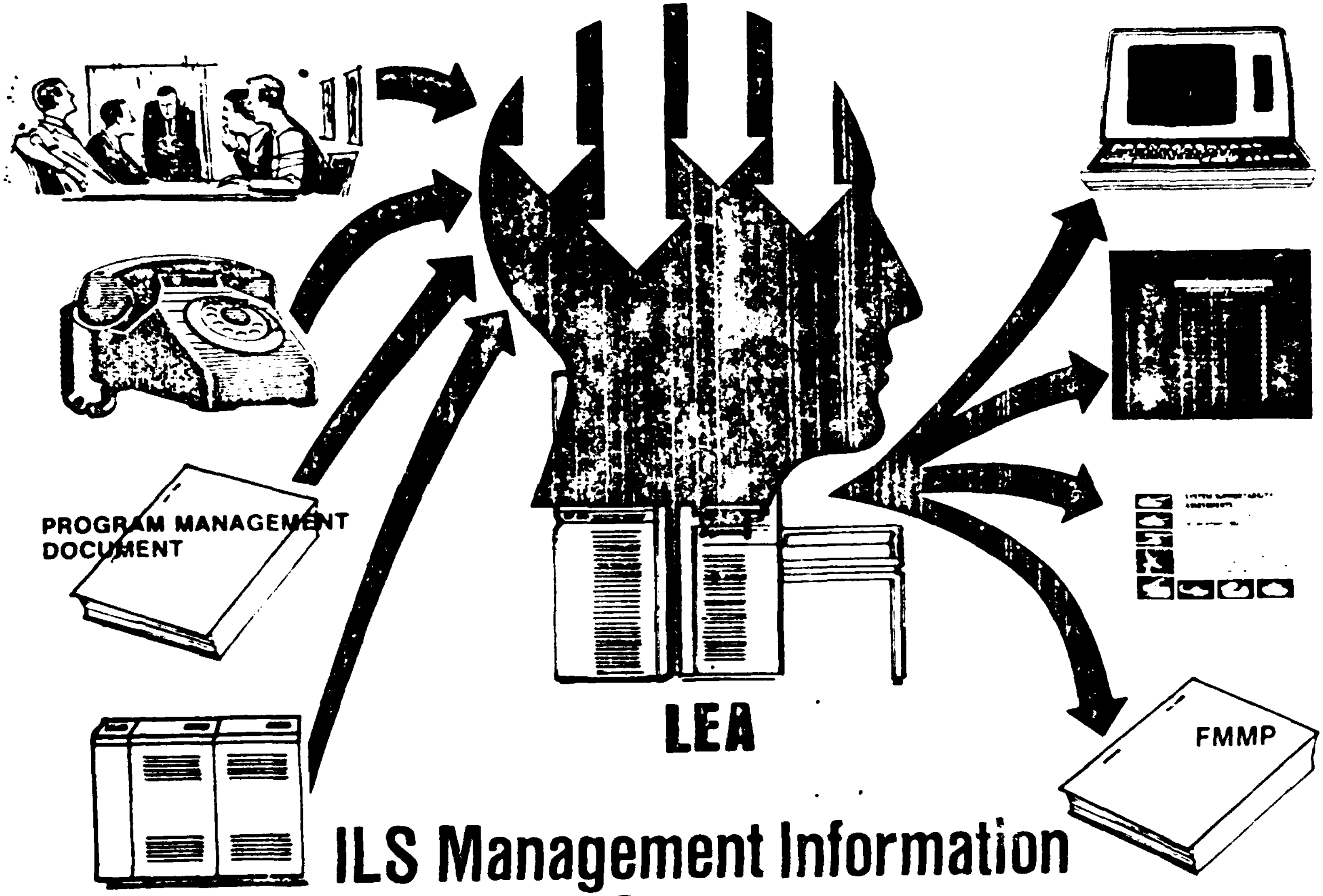
AR 70-61

Chart 16 (ILSMIS)

AT THIS POINT ONE SHOULD ASK WHAT HAPPENS TO ALL THE DATA USED BY THIS INDEPENDENT LOGISTICIAN. THE MAN-COMPUTER INTERFACE DEPICTED HERE IS LEA'S INTEGRATED LOGISTICS SUPPORT MANAGEMENT INFORMATION SYSTEM.(ILSMIS) ALL THE DATA GENERATED DURING THE LENGTHY EVALUATION PROCESS IS SCREENED BY LEA ACTION OFFCIERS AND PLACED ON COMPUTER RECORDS ACCESSABLE BY ANY INTERESTED COMMAND OR AGENCY. HARDCOPY SUPPORTABILITY ASSESSMENTS ARE GENERATED ON DEMAND AND QUARTERLY ALL THE HARD COPY SYSTEM SUPPORTABILITY ASSESSMENTS GENERATED BY THE ILSMIS ARE PUBLISHED AND DISTRIBUTED TO USING COMMANDS AND OTHER ACTIVITIES INVOLVED WITH ILS MANAGEMENT.

Chart 16 off

Chart 17 on



ILS Management Information System

16

Chart 17(Not Again)

Pause

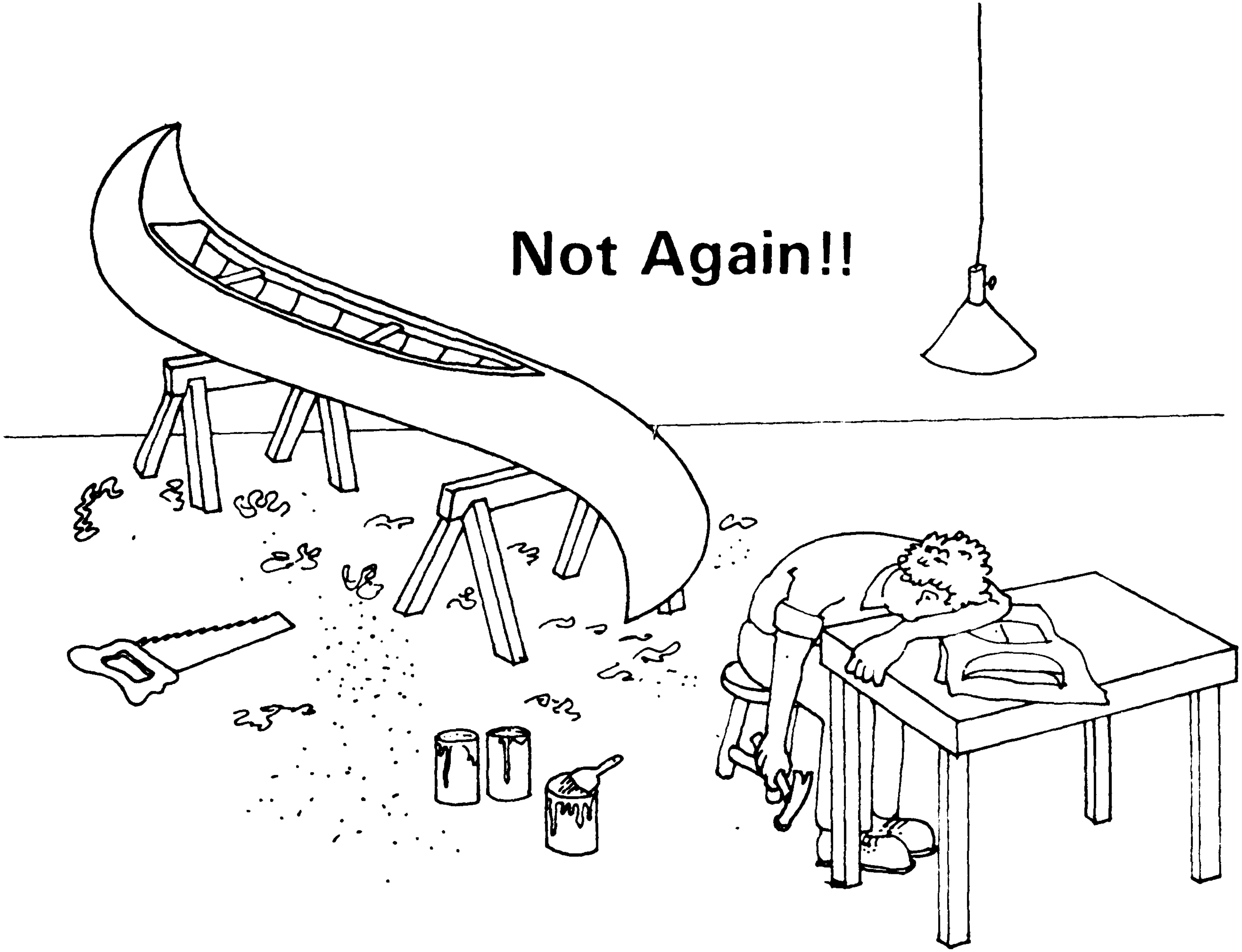
IN SUMMARY, IT OBVIOUS THAT WE LOGISTICIANS NEVER WANT TO FIND OURSELVES IN THE POSITION SHOWN HERE.

Chart 17 off

Chart 18 on

CONSIDERING THAT EACH OF US STRIVE FOR PERFECTION I BELIEVE THIS DESCRIBES BETTER WHAT PROPER ILS CAN LEAD TO. I HOPE THAT I LEAVE YOU WITH A BETTER UNDERSTANDING OF WHY LEA STRIVES FOR PERFECTION IN ILS, REQUIRES THAT ALL SYSTEMS OBTAIN SUPPORTABILITY ADEQUACY AND WHEN OUR ASSESSMENTS PORTRAY RED ON MANY ELEMENTS YOU KNOW WHY THIS CONCLUSION WAS REACHED. THE BEST WAY TO UNDERSTAND WHAT ADEQUATE SUPPORT CONSISTS OF IS TO WEAR THE SHOES OF THE USER WHEN MAKING SUPPORTABILITY DECISIONS. WE SHOULD ALWAYS TRY TO GIVE THE USER THE BENEFIT OF ANY DOUBT BY SOLVING HIS SUPPORT PROBLEMS BEFORE HE RECEIVES THE EQUIPMENT BECAUSE EXPERIENCE PROVES THAT ONCE FIELDED IT IS HARD TO MODIFY EQUIPMENT. I TRY TO LIVE BY A SAYING THAT I BELIEVE TO BE ORGINIAL" YOU CAN'T FAIL UNLESS YOU TRY AND FAILURES NEVER TRY",TO ME THIS MEANS YOU ATTEMPT TO ACHIEVE FOR THE USER THE SUPPORT THAT HE DESERVES. THANK YOU FOR YOUR KIND ATTENTION.

Chart 19 off


Not Again!!

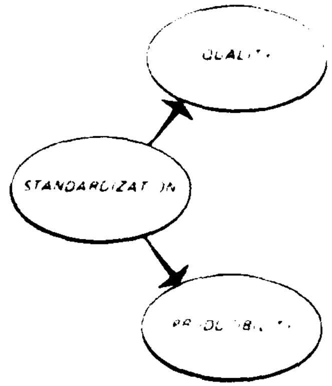
APPROPRIATE STANDARDIZATION IN THE ACQUISITION PROCESS

Presented by

Gordon R. England
Director Avionic Systems

GENERAL DYNAMICS
Fort Worth Division

STANDARDIZATION IS A BASIS OF HIGH PRODUCT INTEGRITY



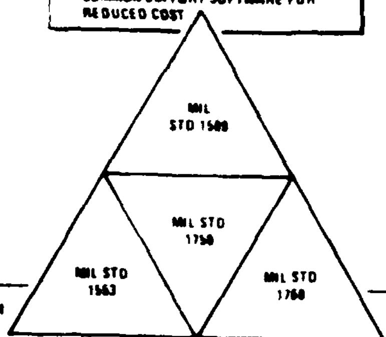
BENEFITS

- PRODUCTION UNIFORMITY
- REDUCED DEVELOPMENT TIME SKILLS COST AND RISK
- COMPETITIVE SOURCING TO COMMON GROUND RULES
- COMMONALITY REDUCES DIVERSITY & DEVELOPMENT SURPRISES
- TECHNOLOGY TRANSPARENCY ALLOWS INNOVATION
- HIGHER PRODUCTION RATES AND ECONOMIES OF SCALE

CURRENTLY USED SYSTEM LEVEL STANDARDS

PRIMARY SOFTWARE INTERFACE

- COMMON HOL FOR EASY MAINTENANCE
- COMMON SUPPORT SOFTWARE FOR REDUCED COST



PRIMARY SUBSYSTEM INTERFACE

- EASY GROWTH OF SUBSYSTEMS
- SUBSYSTEM INTEROPERABILITY

PRIMARY WEAPON INTERFACE

- SIMPLE TO ADD NEW WEAPONS
- IMPROVED INTEROPERABILITY (USAF and NATO)

NEED FOR NEW STANDARDIZATION

NEW TECHNOLOGY

- VHSIC (Many Players)
- HIGH SPEED INFORMATION NETWORKS
- NEW HIGH LEVEL SOFTWARE FOR DISTRIBUTED AND HIGH SPEED REAL TIME APPLICATION

NEW REQUIREMENTS

- AUTOMATION OPPORTUNITY FOR A STANDARD COCKPIT
- FUSION NEED FOR INTERSYSTEM STANDARDS

REPLACE CURRENT SUPERCEDED STANDARDS

- ADA VICE 1589B
- HIGH SPEED BUS VICE 1553

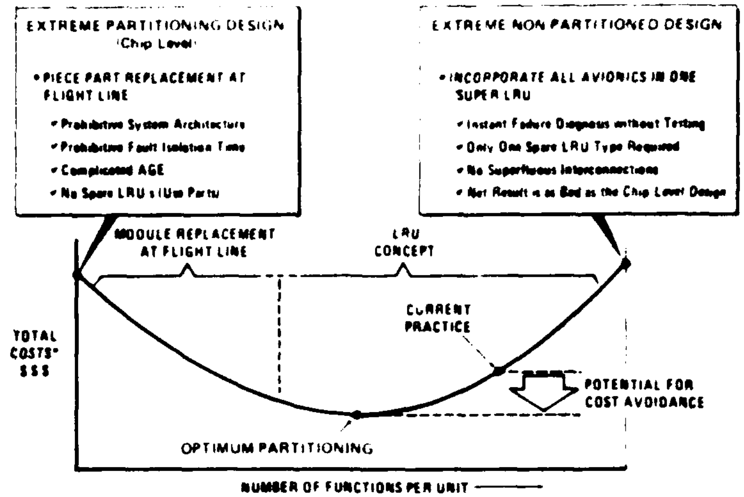
BARRIERS TO STANDARDS ADOPTION/ACCEPTANCE

- MANY VESTED INTERESTS
- DIFFERENT PHASING OF MAJOR PROGRAMS THAT FOOT THE BILL
- LACK OF BUSINESS INCENTIVES
- TECHNOLOGY EXPLOSION
- PROMISE OF EVER NEWER TECHNOLOGY
- DEVIATIONS TO ACHIEVE COMPETITIVE ADVANTAGE
- UNEVEN APPLICATION REQUIREMENTS
- BOW-WAVE COSTS

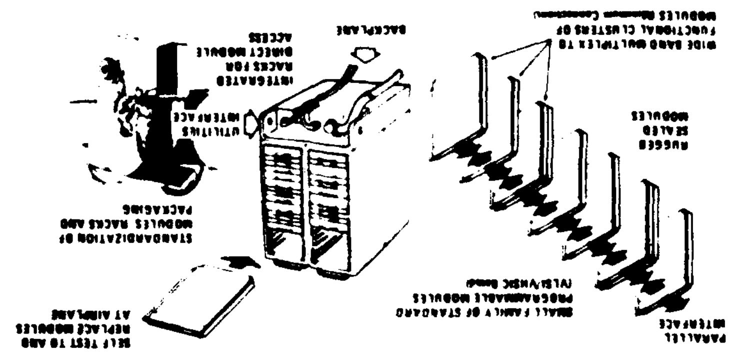
BARRIER REDUCTION

- UNIVERSAL APPLICABILITY LEADING TO UNIVERSAL ACCEPTANCE
- TECHNOLOGY TRANSPARENCY
- BUSINESS INCENTIVES
- FAIR REQUIREMENTS EVENLY APPLIED
- CONSENSUS THROUGH USERS GROUPS
- START STANDARDIZATION AT THE LAB LEVEL OF DEVELOPMENT
- REQUIRE COEXISTENCE OF EXISTING AND NEW STANDARDS

THERE IS AN APPROPRIATE LEVEL TO STANDARDIZE: PHYSICAL AND FUNCTIONAL



*TOTAL COSTS MUST INCLUDE (1) ALL CATEGORIES OF SUPPORT COSTS FOR ALL ECHELONS OF MAINTENANCE AND (2) PENALTY BENEFIT CHARGES FOR SYSTEM DOWNTIME/AVAILABILITY



STANDARDIZED MODULAR AVIONICS

IMPACT OF NEW TECHNOLOGIES

NEW ARCHITECTURES

- HIGH SPEED INFORMATION EXCHANGE
- SHARED ASSETS
- UNSPECIFIC ON LINE SPARES

VHSIC:

- AFFORDABLE CHIP LEVEL SELF-TEST
- HIGH POWER IN A SMALL PACKAGE

MONOLITHIC R.F.

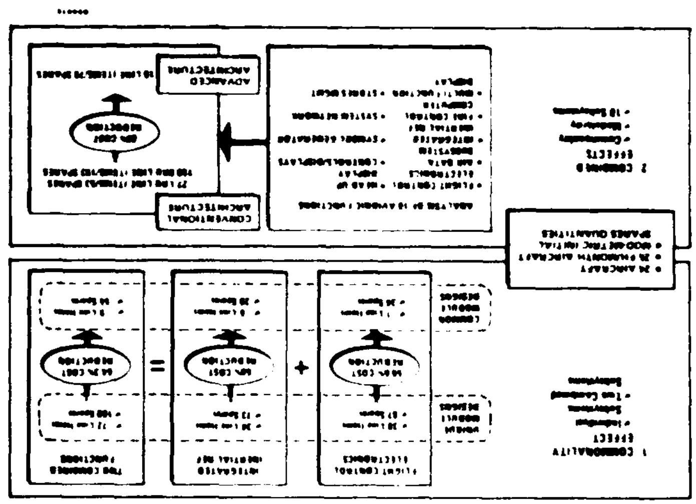
- EXTEND NEW TECHNOLOGIES AND ARCHITECTURES TO THE "FRONT END"

CANDIDATES FOR EARLY STANDARDIZATION OF MODULAR AVIONICS

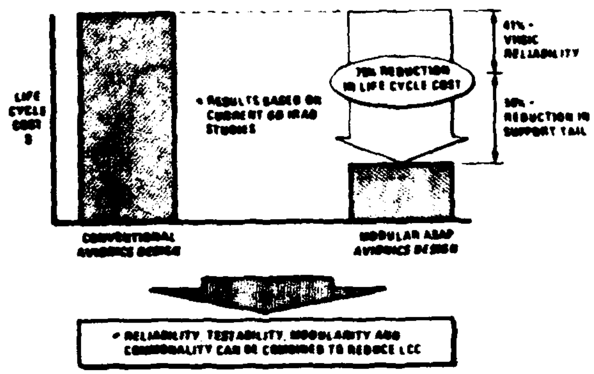
- ARCHITECTURE: GLOBAL, LOCAL AND INTERNAL
- INTERFACE
  - SERIAL
  - PARALLEL
- MODULE CHARACTERISTICS
- SOFTWARE APPROACHES FOR DISTRIBUTED SYSTEMS/SIGNAL PROCESSORS
- INTEGRATED RACKS
- CONNECTORS/PIN-OUTS/BACKPLANE
- FIGURE OF MERIT FOR UNIT COST PER UNIT OF REMOVAL PER MEANTIME BETWEEN REMOVALS

COST CONSIDERATIONS

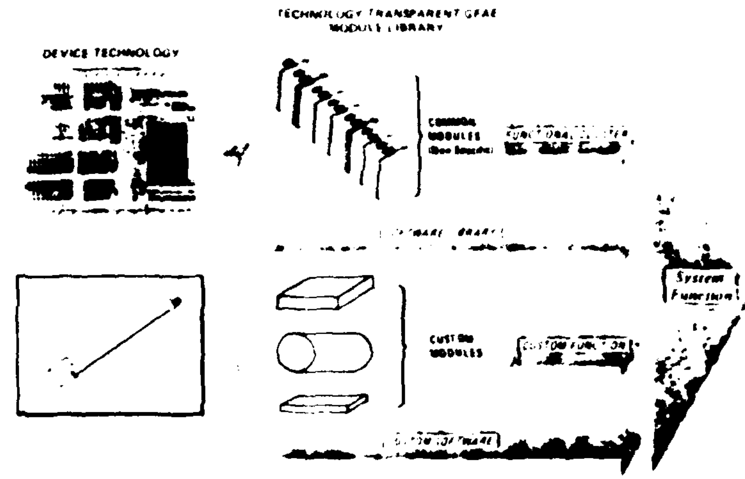
COMMONALITY AND MODULARITY REDUCE SPARES COSTS



ADVANCED ARCHITECTURE SHOWS 75% LCC SAVINGS

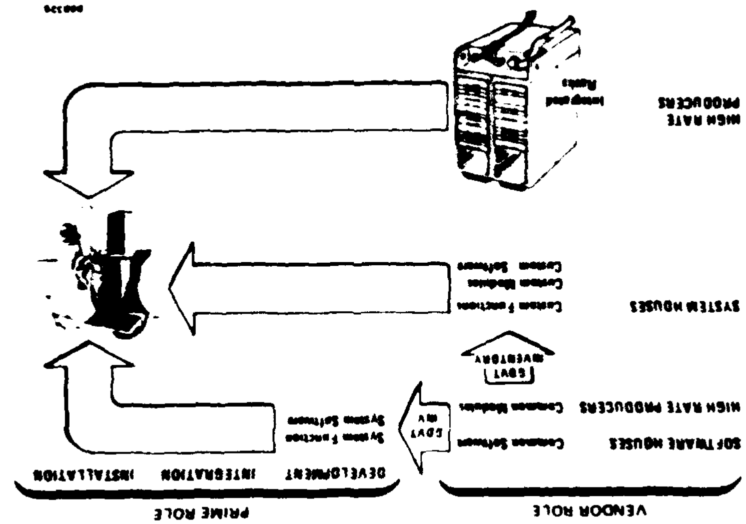


HOW DO MODULES BECOME SYSTEMS?



ISSUES IN THE ACQUISITION PROCESS

DEVELOPMENT AND ACQUISITION ROLES



INAPPROPRIATE STANDARDIZATION

- WRONG LEVEL TOO LOW - COMPONENTS NEED GENERIC SPECS
  TOO HIGH - TOTAL SYSTEMS ARE TOO DIVERSE
- CONSTRAINING FOR EXAMPLE LACK OF HIGH SPEED PORTS ON SMANS
- HARDWARE DEPENDENT BUILT IN OBSOLESCENCE
- OVERSCOPED NO ALLOWANCE FOR SUBSETS
- LACK OF EXTENDABILITY FOR EXAMPLE, 1553B TO HIGH SPEED BUS
- OPEN ENDED LACK OF SUBSET CLAUSE TO ALLOW SUPERCESSION
- MONOPOLISTIC
- IMMATURE TECHNOLOGY

STANDARDIZED MODULAR AVIONICS WILL ALTER AIR FORCE & INDUSTRY PRACTICES

- MAJOR PORTIONS OF ALL SYSTEMS WILL BE BUILT FROM A SMALL SET OF COMMON, MULTI-USE MODULES
  - CHANGES COMPANY PRODUCT LINES AND ALIGNMENTS
- SYSTEM FUNCTIONAL DIFFERENCES WILL CONSIST PRIMARILY OF INTEGRATION, ALGORITHM/SOFTWARE IMPLEMENTATIONS AND CUSTOM SENSOR/EFFECTOR MODULES AND SOFTWARE
  - NEW DEVELOPMENT APPROACHES & SOFTWARE MANAGEMENT
- STANDARD, MULTI-USE MODULES MAY BE MULTI SOURCED BY A SINGLE AGENCY FOR MULTI-SYSTEM USE MODULES ARE NON-SPECIFIC UNTIL LOADED
  - NEW ORGANIZATION CHARTERS AND PROCUREMENT POLICIES
  - FEWER UNKNOWNS IN THE DEVELOPMENT AND ACQUISITION PROCESS
- SOME TRADITIONAL FUNCTIONS WILL WITHER OR DISAPPEAR
  - INTERMEDIATE SHOP (Sources, Personnel, Training, Deployment)
  - MAINTENANCE TRAINING AND COMPLEX T.O.s
  - DEPOT REPAIR (Revert to Manufacturer or Discard)

SUMMARY

SUMMARY

- CURRENT STANDARDS HAVE PROVEN BENEFICIAL
- NEW STANDARDS ARE NEEDED TO ADDRESS NEW AND EVOLVING TECHNOLOGIES
- CANDIDATES FOR EARLY STANDARDIZATION ARE ARCHITECTURE SERIAL AND PARALLEL INTERFACES MODULE PHYSICAL AND FUNCTIONAL CHARACTERISTICS AND SOFTWARE CONSTRUCTS
- FUTURE DEVELOPMENT AND ACQUISITION ROLES FOR INDUSTRY WILL BE LARGELY UNCHANGED
- DoD SERVICE ACTION IS NEEDED NOW TO ADDRESS THE NEXT ROUND OF STANDARDIZATION INITIATIVES

Section [illegible]

ARTIFICIAL INTELLIGENCE AND ROBOTICS

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The purpose of this paper is to try to communicate why behavioral scientists, specifically those charged with responsibility for research to maximize combat effectiveness of soldiers in military systems, are interested in certain selected techniques developed in the domain of artificial intelligence. Hopefully, this paper will explain what we believe artificial intelligence is, why we are interested in certain aspects of it, and what we expect it to do for us.

Artificial intelligence today, as approximately two decades ago, is an area of much interest, concern, confusion, and myth. I would like to begin by attempting to demystify the myth. The myth is that artificial intelligence will lead to machines that think. Exposure to this myth is fairly frequent. It is personified in HAL in the movie "2001", and in R_2D_2 in "Star Wars". Ethical issues aside, it is my belief that our purpose is not to create machines which think, but to create systems which can provide assistance to overloaded human beings, who will inundated with data and operating under terrific time constraints. The need for such systems is great. So to is the promise of relief being offered by some of the techniques of artificial intelligence. It is my belief that if sufficiently realistic goals are set, artificial intelligence eventually can provide incalculable assistance to humans in such operational settings. This is the promise of artificial intelligence. Now let me try to be more explicit with regard to the areas of particular interest.

What Is Artificial Intelligence (and Robotics)?

As is often the case, in rapidly developing areas there are almost as many formal and functional definitions of artificial intelligence as there are practioners involved in the field. For the purpose of this exposition, I should like to fall back on a simple, somewhat simple minded, definition of artificial intelligence. That is, that artificial intelligence is the study, design, and development of systems that perform logical functions which, when done by humans, are referred to as "intelligent". Obviously, this rather loose definition encompasses quite a large area. Specifically, behavioral scientists are interested in a particular subset of the problems implied by this sweeping definition. This subset involves research and applications, using the techniques developed within the domain of artificial intelligence, for teaching people and for providing assistance in problem solving, decision making, and planning. These concerns can be lumped under the general rubric of "expert systems" - a term that will be functionally defined later on.

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As a very brief aside, let me address the area of robotics. The brevity of my comments on robotics will be due to my lack of knowledge of the area, rather than to my having crystalized extensive knowledge into a few succinct statements. As a behavioral scientists, I have only a laymans knowledge of, and appreciation for, robotics. Nevertheless, I feel safe in stating that robots appear to offer tremendous potential for doing either extremely tedious or extremely hazardous jobs that human beings do not wish to do, fatigue rapidly on, or should not be exposed to unless absolutely necessary. At the current time there exist a large number of industrial, or so called "assembly line" robots. These are complex machines which, when thoroughly preporgramed, can perform a complicated series of tasks, many of them extremely intricate and requiring sensitive manipulation. These are not the type of robots which are of interest to the research community trying to provide some assistance to military operations. Rather, the kinds of robots of concern are systems capable of receiving sensory input or communications from the environment, understanding this environment by the use of buit-in models, formulating the necessary plans for taking action in this environment, excuting the plans, monitoring the execution and providing necessary modification to the operation, as either the enviroment or the specific task changes. If such robotic systems are to be developed, experts are agreeded that four areas are required to advance the current state-of-the-art. These are the development of appropriate sensors, mechanisms for suitable manipulation, mechanisms for locomotion, and the so called "intelligent superstructure" -- the data compiling, problem solving and planning algorithms which are necessary if such systems are not to be completely preprogramed for every step of their operations. It is this last area, i.e. the intelligent superstructure, which is of interest to behavioral scientists. In fact, it is my contention that the same research problems and considerations to be discussed under expert systems, apply equally whether these planning and monitoring systems are enbedded in large underground computerized command posts, small portable microelectronic systems, or self contained mobile robots.

Why The Interest?

Why the intense, apparently sudden, interest in artificial intelligence on the part of behavioral scientists? For years psychologists have worried about decision making. They have studied it under stress, under uncertainty, and under a variety of conditions. Similiarly, behavioral scientists have looked at methods and strategies for instruction for an extended period of time. Only recently have they become aware of the fact that individuals calling themselves artificial intelligence research personnel have attempted to address many of the same problems using a different battery of tools, tools which to behavioral scientist appear strange but highly powerful in comparison to the methods that they themselves have used. Years ago Minsky stated that cognitive psychology provided a mode of how humans processed information and this model provided material for artificial intelligence investigators to initiate research on how such behavior could be incorporated into computer driven systems. However it is only in the past several years that the cognitive psychologists and artificial

intelligence personnel have started to talk to one another, becoming increasingly aware of one anothers interest in similar efforts, and begun to develop a field now known as cognitive science, which attempts to encompass these diverse approaches within it.

While the above may explain the apparent sudden interest, it does not explain the intensity of this interest. This is generated by the vision those of us working in support of military systems and operations have of the foreseeable future. A vision mirrored in the concerns which behavioral scientists and others have of emerging conditions in the society as a whole. Certain trends already apparent, are predicted to severely increa within the next one to two decades. Among these are an increasing flood of data, with an accompanying paucity of information. That is, individuals will be so over whelmed by the follow of specific pieces of input that they will have insufficient time to sort through them and put the significant pieces together to determine the information content carried by these multiply messages. Further, it is anticipated that normal day to day operations will occur under considerable more time compression, particularly compressed in the battlefield of the future. At the same time, we are becoming aware that the increasing complexity of the systems, upon which we are becoming increasingly dependent, continues to accelarate. For operators of such systems this leads to two problems. One problem is learning to use the new system. The second is learning to understand the system, what it does, and what it will provide, so that users can make appropriate use of the information provided. A side issue here, but one of which research personnel are becoming increasingly aware, is the need to provide users with a mental model of the operations internal to such a complex system, so that, as the system partially degrades, for whatever reason, and the information provided to the users is no longer completely accurate, they will be able to both recognize that the data provided to them are off the mark and will be able to make a mental estimate of the necessary correction to apply to the provide to the output data so that they can continue with these critical, time pressured tasks. An equally important set of problems arise for the personnel who have to maintain such complicated systems. They must learn how to do day to dav problem more complex analytic problem solving in terms of their diagnostic troubleshooting. The potential problems enumated above lead interest in two major areas. For both operations and maintenance personnel there is the problem of learning to do the task. This has lead to an increasing focus on what is referred to in the jargon of the trade as "intelligent computer based instruction". In theory, this is instruction provided by a computer driven system, which is individually tailored to the needs of the specific individual attempting to learn. A somewhat fuller discussion of ICAI will be presented below. The second major area which arises, is the need to provide expert aiding devices to problem solvers, be they decision makers or maintenance personnel. Both of these areas of research, ICAI and aids for problem solution, can be subsumed under the general heading of expert systems. In brief, an expert system is one which contains the knowledge of the expert, and which is available to the user providing suggestions for how to procede in problem solving, as well as specific data for the solution of the problem, throughout the course of the

problem solving session. Such systems not only incorporated expert knowledge and an optimal approach to the problem solution, but respond to the specific needs of the individual user as he or she attempts to proceed through the problem. In sum, they are "user friendly" - that they provide the information that user needs, in a way which the user can easily get to and comprehend, as the user needs it, and in the format which the user finds comprehensible.

In sum, the intense interest in the techniques of artificial intelligence an the part of the behavioral scientist, particularly in the military setting, is that it is anticipated that these techniques will help us to provide answers so that the people can cope with the future problems of the operational Army.

What Is Expected?

To elaborate on the concepts above, there are several major issues where artificial intelligence techniques are seen as potentially invaluable tools in current and future research. Among these are how people learn, including how people incorporate new information into an already existing data base and how they learn by analogy. Another area is that of how people organize, retrieve and use information. This is the area known as "knowledge representation" within the artificial intelligence domain. Another area is that of how people make decisions, this includes stepwise decisions in problem solving, and how they plan, which may be reviewed as a sequential series of small problem solving situations strung end to end.

There are three specific areas of research interest which I would like to discuss. These are intelligent computer aided instruction, decision aiding, and a somewhat more diffuse series of problems under the general heading of requirements for basic research.

Intelligent Computer Aided Instruction (ICAI): For several years there has been an increasing interest in utilizing the computer to teach specific subject matter to individuals. Two specific advantages are claimed for such instruction. First, the ratio of teachers to learners is reduced, while at the same time freeing the instructor to focus on the unique problems of the student or the instructors special, "expert", none routinely captured knowledge. The second advantage is the ability of the student to go through the program at his or her own pace. Such "self paced instruction" allows each student to progress through each segment of his or her own rate without regard for the rest of the class. Intelligent computer base instruction (ICAI) is an attempt to take such computer based instruction one step further. The concept in ICAI is that the system will have a model of the well trained student built into it. The student will be able to take a initial series of preprogrammed or self selected segments at his or her own pace. Throughout the course of the various segments, the computerized system will be able to respond to students' queries with regards to specific pieces of subject matter. At the same time, the computer will be able to do two other things. First, it will be able to query the student, using so-called computer adaptive techniques, which extract knowledge about what the student knows more rapidly, to develop a picture of the students understanding of the subject matter at any given stage of the sequence and to match this against its idealized model of what the student should know at this point. Under true ICAI conditions, the system will be able to modify the pre-program course of instruction to address the unique problems of the gaps in a given students knowledge. Second, and perhaps more important, the system will be able to detect plans in

the students knowledge base, previously undetermined, and drawing upon a large bank of materials, will be able to provide either necessary background or the underlying material for the individual student, or provide alternate explanations. This letter is a more important point than previously realized. Recently, it has been discovered that as much teaching is in terms of analogy, it is imperative to determine wether the student understands the similarly underlying model being used. For example, it is common practice to describe electric flew in terms of water flow. However, recently it has been determined that many individuals have a faulty understanding of the phenomena of movement of fluids through pipes. Accordingly, explanations covered in these terms are often not understood by the student. The systems envisioned would dete-mine this and provide alternate explanations. In sum ICAI offers a promise of truly individually tailored teaching, capable of coping with the unique learning styles and approaches of each student, while insuring that the underlying knowledge base is properly imparted or brought up to snuff during the course of the instruction. Finally, it offers the opportunity to provide the most expert instruction gleaned from subject matter experts while freeing the instructor to concentrate on those unique aspects of his or her experience or pedological style which cannot be expilicty captured in any automated system. The ability to analyze, idenitfy and work with the students individual method of learning new knowledge and incorporating this into his or her existing knowledge structure is an area where much exploration remains to be done. However, initial work indicates that this is not only possible, but that it may be possible to modify the students learning behavior in given situations; to insure more complete and efficient learning. Although still in the early stages research on, ICAI offers sufficient promise to have generated considerable excitement and activity among both researchers, teachers, and potential students.

Decision Aiding: Efforts have been made to develop systems which will collect, process and collate large amounts of information for use by decision makers for many years. The first of these systems, was the "SAGE Air Defense System". The first large scale such system was 465L -- developed for control of worldwide operations of the Air Force's Strategic Air Command. Two problems identified earlier in research on such systems were the need to determine optimal methods for collating and presenting to potential users the data contained within the system, and the fact that by consending such information and eliminating some of the primary reports, a filtering system was being built between the ultimate user and the raw data. Within recents years the focus of concern has begun to shift towards how to digest and prepackage large amounts of complex data in shorter periods of time, so that decision makers can be saved the time consuming work this involves, and allow them to focus their expert skills on the decision making itself. A related problem, arises from research which indicates that even expert decision makers, functioning in their area of expert knowledge, are subjected to systematic bias, of which they are unaware. This leads to the question of when to automatically call certain machine processing capabilities into effect to avoid this type of bias. For example, in certain specialized situations, probability assessments must be based on the complex calculations of the Bayesian, conditional probability distribution, rather than the Gaussian, normal distribution. Under the stress of time pressure,

experienced decision makers often fail to distinguise this special set of circumstances. Further, when they do, they do not have the time to make the necessary complex and time consuming calculations in their heads. This leads to a question of when to call into play these high speed, specialized routines of the computer, and is really a specialized subset of the problem of the optimal allocation of effort between human and machine.

The problems described above will be acerbated as decision makers are required to deal with more complex and complicated situations, with considerably more sensor input data, under the compressed timeframes envisioned for the potential future battlefield. If decision makers are not to be swamped by the flood of input data, some way must be found to sort through it for them, to make some sense of these multiply inputs, to evaluate them as the decision maker would, and to present them to the decision maker in an extremely rapid timeframe. Such a system would be of vaulable assistance by allowing the decision maker to focus on the ultimate use of the input data, rather than spending considerable time sorting through the raw inputs.

Further, such systems offer the opportunity to deal with two problems which will become of increasing severity in future time compressed operations. The first of these is an unfortunate, but often replicated finding, that individuals under stress, tend to fall back on their previous experience rather than using their intelligence. This should not be interperted to indicate that individuals, in particular leaders for whom this finding was first determined, are stupid or that intelligents is not important for such individuals. What it indicates is that human beings, including leaders, when placed under sufficient stress begin to deteriorate in their performance. Decision aiding systems are one possible way to alleviate this problem, as well as the problem of systematic bias mentioned above. Second, such systems, if they are based upon truly efficient decision making procedures, derived from experts in the area, offer the potential for providing all decision makers with the most expert knowledge available in their specialized field. Some of the techniques incorporated into such system would serve this purpose by automatically suggestion alternate approaches for processing and interpreting the input data and providing the decision maker with a range of interputations based upon these alternate approaches. In this way, they offer the opportunity of providing a more flexible predigested data base from which the decision maker could operate.

The ability to provide flexible input to decision makers is a future promise. Current systems, as a rule, are not this advanced. Current systems require that constraints, either those of the environment or those imposed by the decision maker, be prepackaged into the existing data bank. Once built in, such constraints are not modifiable. As a result, the systems are rigid and cannot response either to changing demands of the environment or changing requirements of the decision maker. Current research is beginning to explore avenues for alleviating this problem.

If planning is looked upon as the sequential solution of a number of specific problems, with the results of one step impacting upon the input data for the next solution in the chain, such decision aiding systems can be viewed

Developing New Techniques - Basic Research: While one individuals basic research is anothers applied, the applications of artificial intelligence techniques in the areas of ICAI and decision making/problem solving/planning as discussed above, commonly are regarded as applications of already existing techniques. A number of other questions arise with regard to developing or modifying tools, which will allow the resulting system to offer greater flexibility and begin to approach truly "intelligent" processes, either by mimicing the procedures used by human beings or by developing alternate ones. There are a number of these areas of basic research which are of paramount interest at the given moment. Among these are:

"Flexibility of Constraints -- Current systems must be built with constraints with regard to allowable situations and ground rules. Once built in these are not modifiable. Unfortunately, this does not correspond to the constraints imposed by the real world. Current investigations are looking at ways to make such constraints modifiable. Further, there is a growing interest in developing approaches which will allow the user to insert the constraints she or he feel appropriate, based upon her or his expert knowledge, at the moment of use. The difficulties which this inability to modify constraints imposes upon such systems has been known for awhile, but came particularly to the fore in the attempt to develop automated systems for airplane traffic direction.

Flexiable Goal Setting -- Humans are capable of setting out to achieve one objective, assemble their resources to do this, determine the most appropriate approach and assess the probability of success or failure in a given operation. However, humans also are capable of identifying a target of opportunity, not previously known to them, and modifying their plans based upon an assessment of the value of the new objective or goal, the probability of success in this undertaking based upon suitably modified plans, and the cost of delaying or ignoring the accomplishment of the original goal. This truly is adaptive behavior. Current systems do not exhibit anything like this degree of human adaptive behavior. Basic understanding of how to develop such systems is an area of considerable interest.

Self Teaching Systems -- Human beings are capable of learning from their previous experience. As they go through various experiences they modify their subquent behavior based upon what they have learned in previous similiar situations. Development of techniques for incorporating such learning from experience on the part of large computer systems is an area of considerable interest at this time, albeit a largely unexplored one.

Partially Incomplete/Inaccurate Information: -- When forced to do so, human beings can operate with incomplete data and/or partially correct data while making assessment of the incompleteness or inaccuracy of the data and the potential impact that this has upon their decisions and/or applications. It is hoped that in the next decade, tools for developing systems capable of similar performance will be developed.

precursors to planning systems. As we learn more and more about the mechanisms which humans use in planning activities, the possibility arises that we may be able to begin to develop truly adaptive systems where constraints may be modified as occasion arises and where it may be possible to do planning just prior to the time of use rather than trying to prepackage as is currently done. The knowledge of planning approaches per se, known as Metaplanning, is an area of intense interest at this time.

Two further comments seem appropriate with regard to decision aiding/problem solving/planning systems. The first of these is that a major area of current concern is for so called distributed planning. This is a situation where decision makers, who are not colocated, will be making independent decisions, but where the results of one individual's decisions have some impact upon the progress of another decision makers plan. Although something is now about the ways individuals make decisions, and therefore plan, very little is known about the way group decision are made, and almost nothing is known with regard to the problems which may evolve in distributed decision making. To complicate the situation, there is the problem that the distributed decision makers will have only partially overlapping data bases. The question of the necessary redundancy and data base sharing required for such systems remains open.

The second comment with regard to such decision aiding/planning systems is really a more general one in regard to expert systems in general. Expert systems, as stated above, attempt to incorporate the data base and procedures of recognized experts in the field. The small number of systems which have been successful to date, typified by Mycin and Prospector, have operated from the assumption that all knowledge in a given area was known, could be incorporated into a data base, and could be called forth as necessary. Despite the tremendous increases in chip technology, microelectronics, and computers in general, some question has begun to be raised about the ability to incorporate all domain knowledge within a given system, particularly when the question of small size, rugged packaging for battlefield use, and transportability must be taken into consideration. Further, it is quite conceivable that in the next decade or so, systems will begin to tap into areas where all knowledge is not known, where unique unanticipated situations may be encountered. As a result, there may not be an expert to provide all of the information. Further, workers in the field estimate that it takes approximately three years to get all the knowledge from a single expert incorporated into the system, without any assurance that the data base or procedures are not idiosyncratic. As a result, there is rising interest in the area that system engineers refer to as critical factor analysis, i.e. an analysis of those points in the problem solving/decision making process which are critical, and require special subsets of data and procedures conceived. This attempt to focus on the critical nodes in problem solving, while an area of considerable argument among experts in the field, offers the possibility of developing smaller scale expert systems which will provide as much assistance to the decision maker/problem solver, while being less cumbersome and time consuming to develop.

Inductive Reasoning: -- Current research, and system development, are largely based upon deductive reasoning, i.e. that is, reasoning from first principles. Unfortunately, this often is not the situation with which military decision makers must deal. More typically, military personnel must take a mass of incomplete, partially inaccurate and confliciting data, and attempt to build from that a picture of the antagonist's operations, with the intent of reasoning back from that as to the opponents strategy and plans, in an effort to develop an appropriate counter strategy and plan. Such reasoning from partial evidence is inductive reasoning, an area of considerable interest but relatively little work at this moment. It is anticipated that research on inductive logical systems will increase in the coming three to five years and that the results will be of significant importance in to future military users.

Nonlinear Problem Solving: -- People are taught to solve problems in a stepwise, linear, "logical" fashion. However, experts in various areas have insisted for considerable time that this is not the way in which they solve problems. They talk about "recognition of pattern", or "jumping into the problem" or other phrases. Only recently has the research community begun to take seriously these expert comments. Now there is considerable interest in the basic research community in the problem of parallel processing of various portions of the problem. Although it is much too early to tell the direction this research will take, the possibility is inherent that this approach it will open lines of exploration into modes of thinking and of problem solving more complex and sophisticated then the stepwise, linear, "logical" processes which have been explored in the past. There are even some who feel that this line of research may begin to open some previously closed doors with regard to the true meaning of intelligence and "creativity".

Summary: Having gone on at greater lenth then I had intended about the many interesting questions for which I do not have answers, and then told you much more about penguins then you wanted to know, it is now time for me to try to return to the original point. I started out to discuss what artificial intelligence and robotics were, why behavioral scientists are so interested, in the techniques developed in these domains, and to tell you what we hope they could do for us. Finally, I come to this last point. Perhaps it is time to make explicit that which has been inexplicit in all the proceeding. That is, that the interest of behavioral sciences in the techniques of artificial intelligence is their promise of providing the guidelines and where with all to develop machine based systems which, by being truly compatible with human thought processes, will be easily accessable and compatible with the needs and requirements of the human operator, and which will offer effective, hopefully optimally effective systems, for teaching large amounts of difficult information to average individuals and providing assists and aids to expert and nonexpert alike in decision making/problem solving/planning in situations where the human mind stands in danger of being overwhelmed by the flood of raw information and

the pressing time constraints of the situation. As our world becomes more complicated, more time compressed, and richer in data inputs, such systems offer the promise of providing assistance to the human intellect by rapidly collating and processing the voluminous data inputs and presenting the user with useable information, while showing the user alternate goals and approaches which they may wish to consider, along with probability assessments of the potential outcomes and impacts of these alternate plans and goals. It is this promise that has generated such interest, enthusiasm, concern, and even fear, with regard to the development and potential application of these systems. Further, it is this promise, which makes many of us feel that, if conceived and kept within realistic constraints, and not over promised, these approaches offer hope for providing assistance to human beings who will have to operate in the complex systems and society we envision in the next several decades.

DEVELOPING TOMORROW'S LOGISTICS SUPPORT ANALYSTS

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DEVELOPING TOMORROW'S LOGISTICS SUPPORT ANALYSTS

KEYWORDS

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ABSTRACT

If Logistics Support Analysis is to be effective, people must be found who can translate early design concepts into support resource requirements. This requires analysts who can operate with little guidance and minimal input data to produce estimates and analyses which can be used by management to select among alternate designs. Such people are difficult to find, hard to retain, and require a unique managerial style if maximum results are to be obtained. This paper presents proven techniques for the development and management of professional analysts.

INTRODUCTION

The directives on Logistics Support Analysis (LSA) refer to it as an iterative process with three essential elements: identification and quantification of the support resources, design influence toward supportability, and development of the support concept. Ideally, to perform these tasks, a person should have a solid background in military aviation maintenance, a degree in engineering, a thorough understanding of all aspects of the logistics system, a degree in statistics or operations research, and, probably, a computer programming background to manipulate the masses of data involved. If such individuals exist, the author has never encountered one. People do exist, however, with several of the required fundamental skills. There are numerous papers, articles, and books discussing the technical process and how to conduct it, but little has been written on how to manage a logistics support analysis program. The nature of the analytical effort, the type of skills required, and the creative, innovative approach required for success, all call for a unique style of management to optimize the results of the program.

THE LSA PROCESS

The identification and quantification of the support resource requirements for a given design, and the utilization of those support requirements as part of the rationale for altering the design in favor of greater supportability require the ability to translate design features into support requirements. The support analyst must be sufficiently familiar with engineering to understand the technical aspects of the proposed design and sufficiently familiar with the logistics system to estimate the spares, support equipment, training, and manpower which are required to maintain the system in the field. The probabilistic nature of the reliability process and the consequent probabilistic nature of the resources required for a specific failure mode must be translated into what are essentially deterministic design requirements for the logistics system.

The process of translating design features into support requirements must be done repetitively at increasing levels of detail and accuracy as the development process proceeds. The familiar chart showing the degree of controllability of program cost could well have been labelled a curve of the flexibility of design. The farther into the design process, the more difficult it is to alter the design for improved supportability. We have then a major dilemma - the accuracy of the analyst's estimates of support resources is lowest at the point when those estimates have the greatest usefulness to the program manager who is interested in increasing supportability.

To the LSA manager, the problem manifests itself in terms of highly motivated, professional analysts agonizing over incomplete data in order to complete a critical trade study that may significantly impact the future of the program. The more the manager attempts to stress the urgency and importance of the task, the greater the tendency for the analyst to want to agonize over every decimal, stall for more or better definition of the data, or start quibbling about technicalities and fine points. A major effort is required to explain this issue to the analysts without falling into the trap of "hip-shooting" the support analysis. It is natural that the analysts who most fall into the "agonizing" group are often the best qualified and most concientious. The one specific thing that can be done is to train an awareness of the sensitivities of the analysis and of how to assess relative sensitivity. With an understanding of relative sensitivity the analysts can use ranges of inputs and determine if critical decision values are within the predicted ranges.

Perhaps the most critical task of the LSA Manager is to assess the relative criticality of accuracy versus timeliness for a specific analysis or trade study and to decide when sufficient data is or is not available to reach an analytical conclusion. The manager must be aware of overselling the analysis. High pressure directed toward the selection of one multi-million dollar approach over another for a possible gain of only a few percentage points of cost difference is ridiculous if the LSA Manager knows that the probable error of the basic data is greater than that. The LSA Manager who cannot or will not face this issue will find that his LSA program is irrelevant in terms of his ability to influence design.

RECRUITING ANALYSTS

What type of personnel should be recruited to fill the LSA Analyst's role if it is so difficult? The critical feature of the analyst's task is his/her ability to translate design into support resources. This requires a familiarity with similar designs and their support resources that is not normally acquired in the industrial sector. The consensus among a fair number of contractors is that this task can best be performed by ex-military maintenance technicians.

The nature of the operating environment and the constraints which that environment places upon the support system make it difficult for technicians without military experience to understand the customer requirement. This talent can best be summarized as a need for "scenario empathy" and "hardware familiarity". The other supporting skills of aptitude for analysis and a methodical orientation are secondary to the ability to "think like a customer".

Practical experience has shown that the actual skills that are necessary for the analysis can be taught fairly readily if the individual possesses the correct attitude and aptitude.

Is it feasible to hire engineers to fill the LSA role? First, engineers are, by and large, much more expensive than ex-military technicians. Second, engineers are a major advantage only in the early, conceptual stages of the LSA process. Once the "documentation" phase of the support analysis program has begun, the engineering talents need be only a minority of the personnel resource, and the ex-military technicians can be very effectively employed. The best of all possible worlds would be a group that met both criteria. However, that group is a very scarce resource. A group that is a balance of the two types, with the mix changing as the program evolves, is the most practical solution. There does appear to be a training effect for the technicians in this environment as well, so that a synergistic effect is achieved.

ORGANIZING THE EFFORT

The selection of "execution tactics" for organizing and executing the LSA effort must be based on a corporate strategy for Logistics Support Analysis. Since the LSA effort is essentially a developmental activity that increases during conceptual development and decreases during production, a strategy must be designed to retain and utilize the analytical expertise over multiple programs if repetitive recruiting and training crises are to be avoided and analytical quality maximized.

The strategy recommended is one of system and analytical specialization with program diversification. The LSA group must avoid fragmentation by program so that the analytic force works several programs. This is particularly useful during the pre-contractual phases of conceptual development when the limited supply of high-quality analysts can be shared by several potential programs until they reach the point where full-time personnel are economically feasible or can be justified to the program manager. The specialization by type of analysis (cost analysis, maintenance planning, spares, estimating, etc.) can be of major assistance in selection and recruitment of an analytical cadre, since no one individual need perform all of the critical functions of a given trade study or analysis. A small number of "systems integrators" will be required to supervise, train, and pull the elements together. This is the resource that must be protected.

One facet of the LSA organization that needs detailed consideration is the baseline comparison study effort. An on-going effort is required to develop and maintain the historical baseline file so that it is available to the analysts for use in comparisons. This data, however obtained, must be processed into a format where it can be understood and used by the program LSA analysts with minimal effort. This data is a critical part of the LSA program and can take a long time to develop if no such effort exists.

To support the field data, a technical order file must be obtained for the baseline weapon system. This also can be a long-lead effort and requires a dedicated maintenance activity. The author has found it most effective to maintain a "data center" that contains baseline comparative data for several programs: field maintenance data, provisioning data, stock number directories

and technical orders. One or two analysts are dedicated to the maintenance of the data center with a collateral function of assisting other analysts in finding, extracting and interpreting the data. In terms of formal organization, the Northrop experience suggests that the most effective approach is to structure major organizations by type of analysis with secondary organizations, considerably less formal, by functional systems. The program integration is handled by designating "lead analysts" for each program from the senior analysts of the group. This type of organization allows the LSA Manager maximum flexibility in responding to program crises by borrowing people short-term across programs.

The Program Managers always want dedicated full time people. It should be explained that the above "matrix" approach provides them with an overall higher quality of personnel and a surge capability for short term efforts such as proposals, special problems, etc. This effort also allows the cost of such activities as the data center, software maintenance, and LSA training to be shared by several programs for an overall cost advantage.

TRAINING

The basic skill requirements for the analyst have already been discussed. The fact that these skills are in rather limited supply implies that the personnel who are actually recruited will require training in Logistics Support Analysis. If a proper in-house software program has been developed, the LSA documentation required by the customer as a deliverable can be insulated from the analysts who work several programs. The data is input to the computer which correctly formats the data for delivery to the customer or for extraction and use by management. The analysts require training only in execution of the software, not in the actual documentation formats. Since LSA data elements are standardized by MIL-STD-1388, the real training requirement lies in the development of the data. However, Northrop has found that training in basic computer literacy and terminal skills is also required for most people in the target population for recruiting. The course outline shown in Figure 1 is from the Northrop LSA Training Course which focuses on basic LSA skills and assumes that the trainee is an ex-military maintenance technician with the correct aptitudes and attitudes. It provides some 100 hours of training in 23 modules supplemented by required reading, homework, and proficiency tests. Upon satisfactory completion of the course, a certificate is presented by the Vice-President, ILS with suitable motivational speeches by the managers involved. The primary stress is on professionalism. A syllabus details the learning objectives for each of the modules. Instructors are selected from the senior analysts who use the established course materials to present a module. These instructors are designated as subject matter experts for the module and are available to the students for questions and follow-up after course completion. This provides recognition and encourages professionalism among the instructors. It also promotes esprit among the LSA group.

Since the instructors are also designated as responsible for the appropriate section of the LSA procedures, their course preparation time usually doubles as a procedural review during which update requirements are identified to incorporate recent experience into the formal procedures. Given the complexity of the LSA activity, the manager cannot maintain an awareness of the

NORTHROP INTEGRATED LOGISTICS SUPPORT
LSA TRAINING COURSE TOPICS

1. INTRODUCTION - TRAINING STRUCTURE
2. LOGISTICS/ILS OVERVIEW
3. LSA OVERVIEW
4. EARLY LSA STAGES
5. FUNCTIONAL BREAKDOWN
6. LSA CONTROL NUMBER ASSIGNMENT
7. SIGNIFICANT-ITEM DETERMINATION
8. FAILURE MODES AND EFFECTS ANALYSIS
9. RELIABILITY-CENTERED MAINTENANCE
10. 66-1 CONCEPT AND DATA INTERPRETATION
11. WORK UNIT CODES
12. BASIC STATISTICS
13. DESCRIPTIVE STATISTICS
14. PROBABILITY ANALYSIS
15. LSA STATISTICS AND ANALYTICAL TERMINOLOGY
16. MEAN TIME BETWEEN UNSCHEDULED MAINTENANCE ACTION DETERMINATION
17. DEMAND RATES
18. SPARES AND COST ESTIMATING
19. REPAIR LEVEL ANALYSIS
20. SOURCE MAINTAINABILITY AND RECOVERABILITY CODES
21. TASK ANALYSIS
22. DESIGN REVIEWS
23. MAINTENANCE PLAN PRODUCTION
24. LSA COMPUTER SYSTEM OPERATION

detailed technical content of the LSA Procedures which constantly require update as newer and more efficient ways of performing the analysis are developed and improved software becomes available. The major portion of the Northrop LSA procedure essentially duplicates the course content and discusses data development. Documentation procedures discuss the operation of the automated LSA system. These procedures constantly require minor revisions to elaborate the explanation of some point regarding data input, bring new software programs on-line, and respond to analyst suggestions for improving efficiency. Maintaining a cross-reference between the data development procedures and the documentation procedures also requires effort but not nearly as much as having the two sets of procedures integrated into a single document.

The Northrop procedures provide a detailed discussion of how to operate the automated LSA software. Each data element required for completion of each data field on each screen is explained, and instructions are provided for movement from screen to screen and field to field. Supporting these procedures are more detailed procedures for each of the major data areas, such as maintainability data, spares estimating, SMR coding, cost estimating, repair level analysis, etc. Since most of the group leaders and managers are also instructors, this approach has permitted a high level of integration among the procedures, the training, and the actual operations.

MANAGEMENT AND MOTIVATION

The recruitment, training, and organization policies presented here provide a framework for the development of an operational Logistics Support Analysis group that can be employed with maximum flexibility to achieve the objectives of MIL-STD-1388. The management of the day-to-day operations of this organization requires some additional comment, if full effectiveness is to be achieved. The analyst force, built up with great difficulty, must be retained within the company and must be motivated to continue to exert its best efforts, even when it may appear that those efforts are achieving little impact. Such motiviation can be best achieved through a combination of participative management techniques. One of the best is the Quality Circle Program.

A hard-line authoritarian, "Theory X", manager will have great difficulty in achieving the objectives of MIL-STD-1388 because the analysts will all too often lack an appreciation of where the program is going or have only limited access to the required technical data. It is this information that permits them to influence those facets of the design that are concurrently under greatest scruitiny by senior management. The properly managed LSA group has extremely good communication lines, both vertically and horizontally. The Northrop experience has found that using some of the "integrators" as "interfacers" and "horizontal data collectors" can actually provide the LSA manager with sources of information that will not be available to him through vertical channels until too late to permit him to influence the decisions.

An essential element of this management style is for the manager to delegate attendance at many technical meetings and perhaps some program office

meetings. There are three reasons to delegate these responsibilities: first, to provide many of his people with visibility and a sense of commitment and involvement; second, to promote a greater awareness within the LSA group of what is going on in the program; and third, to serve as a training effort for future, senior "integrating" analysts. Weekly meetings should be held of the entire analyst force -- where the manager briefs his people on what he sees going on at the top level; senior analysts brief on major projects status; and each working analyst is encouraged to report on his efforts, problems, and questions, particularly regarding objectives -- to promote the necessary vertical and horizontal data exchanges while contributing significantly to group motivation.

One major task for the manager is rumor control. At these weekly sessions, he can find out the rumors, quell them if necessary, and provide a "pep talk", if appropriate, after program set-backs. It also provides a ready forum for personal praise of performers and group corrective action where necessary.

A weekly activity report with quasi-mandatory inputs from all personnel assists these efforts, particularly if the workers are encouraged to submit to the manager everything, including trivia, with the winnowing of what is reported upward left to the manager's discretion. Personnally, the author has found that including a little less important material provides visibility to analysts in less sensitive jobs, a "feel" of the on-going effort to senior managers, and often surprises as to things the manager did not know were happening, both from group inputs and from senior management reactions. It can be an excellent medium for "trial balloons" to test receptivity to major design changes initiated within LSA. It also is a very useful tool at performance review time.

An LSA-group quality-circle can provide the manager with excellent feedback from the floor as to problems with the LSA program. It is an excellent forum for obtaining group support for changes to procedures, policies, etc. While there may be "challenges" to management style, if the manager will himself participate and provide a certain level of leadership, the circle can result in more of the group gaining an understanding of what his goals and objectives really mean. Often, dicussion of the problem results in training that effectively resolves the problem with no managment action really required. The standard quality circle training is, in fact, extremely relevant to the LSA process and provides another source for an analyst in gaining a basic knowledge of the problem-solving process.

One thing that seems to have worked quite well is to maintain a high level of employee visibility over the nature of their job and responsibilities. A fairly detailed job responsibility description was prepared and distributed to all analysts. This job description discusses the purpose of the job, specific responsibilities, knowledge and experience requirements, performance expectations, accountability for job performance, and career progression. The point of the foregoing discussion is to stress that the position is a professional one. The individual must assume responsibility for the success or failure of the program and for insuring that he personally does everything possible to increase the company's profit potential. The

career progress section discusses the difference between the various levels of classification and the types of skills and experiences necessary for progression. A detailed career development record is distributed in conjunction with the job description. It lists the DOD publications and directives over which knowledge is required and the specific modules of the LSA training course for which increasing levels of competence are required if the individual is to advance in grade level. Management charters for the managers of Support System Design and ILS Support Analysis were briefed to the analysts, and copies were furnished upon request. The job description furnished is closely correlated with these charters.

SUMMARY

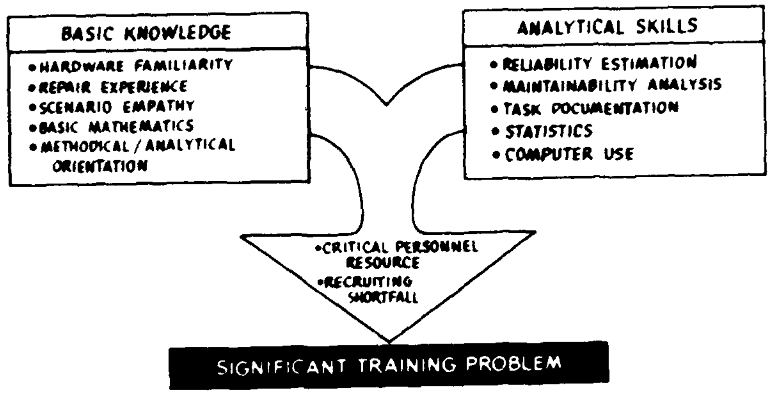
An effective LSA program requires a force of dedicated, professional analysts who are interested and motivated to achieve the objectives of the program. These analysts should possess a rare combination of aptitudes, skills, and job experience which makes them difficult to find, hard to train, and easy to lose to competitors. Developing these analysts requires a very clear understanding of what the manager wants done, how he wants it done, and what type individual he wants to do it. A company strategy on LSA management is essential to prevent the problem from "repeating" itself on each program. Such a strategy as described here will enable a company to develop, and retain, an effective LSA capability. Too many LSA managers start by staffing up the office and then realize that they have hired too many of the wrong talents. Recovering from this can be an agonizing experience for any program. Hopefully, the suggestions here will be of use in preventing such a disaster. While participative management is good sense in most professional organizations, in Logistics Support Analysis it is the only way that the job will ever get done properly.

AGENDA

- THE DATA DILEMMA
- STAFFING THE PROGRAM
- ORGANIZING THE EFFORT
- TRAINING THE RESOURCES
- MANAGEMENT AND MOTIVATION

83-15117
1C

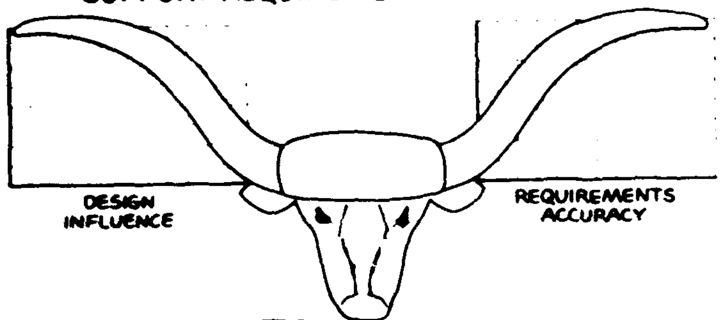
STAFFING THE LSA PROGRAM



82-15046
6A 142

THE DATA DILEMMA

SUPPORT REQUIREMENTS ESTIMATES

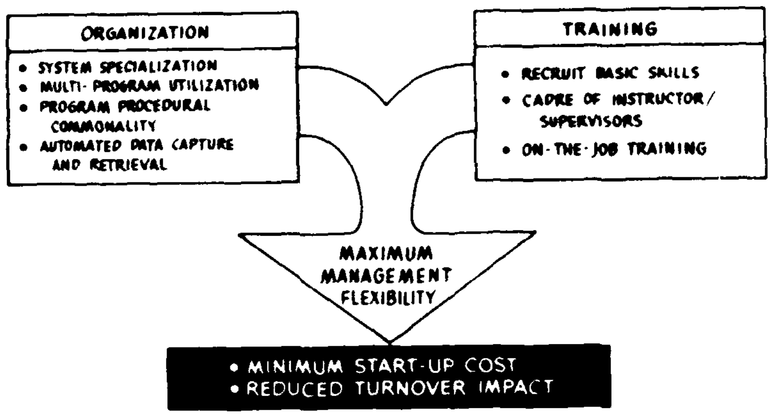


REQUIRES ANALYSTS WITH

- THOROUGH KNOWLEDGE OF LOGISTICS SYSTEM
- DETAILED HARDWARE / REPAIR TECHNOLOGY FAMILIARITY
- ACCESS TO BASELINE COMPARATIVE DATA

83-15129A
6A

STAFFING THE LSA PROGRAM



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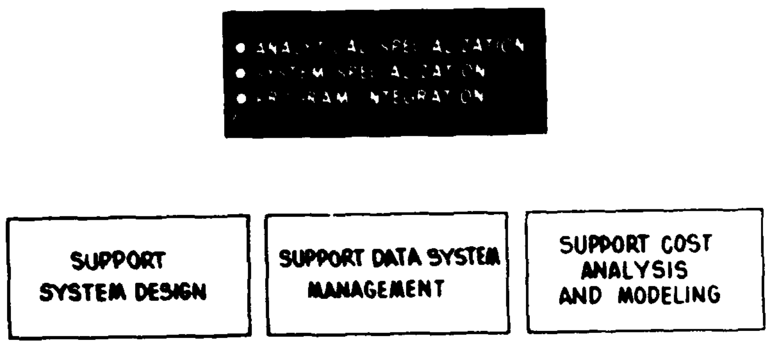
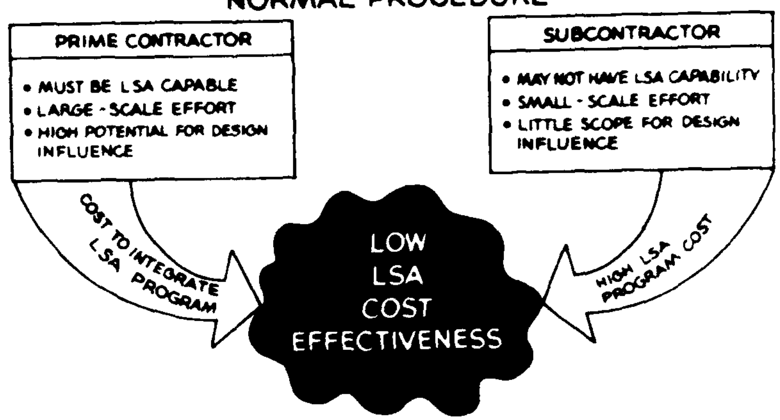
6A 47

SUPPORT ANALYSIS ORGANIZATION CHART



LSA FLOW-DOWN REQUIREMENTS

NORMAL PROCEDURE



SUPPORT ANALYSIS ORGANIZATION

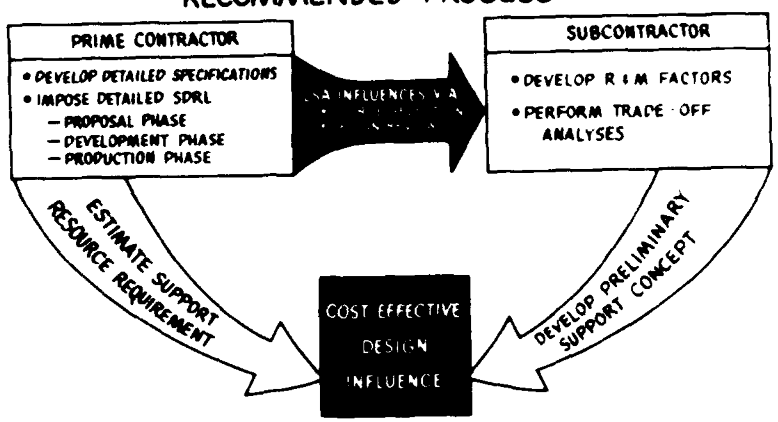
- MAINTENANCE ANALYSIS
- DESIGN TRADE STUDIES
- LSA DOCUMENTATION
- DEMAND RATE DEVELOPMENT
- MAINTENANCE PLANNING
- MAINTAINABILITY
- SE REQMTS/SPECS
- INSTRUCTIONAL DEVELOPMENT

- DATA MANAGEMENT
- LSA TRAINING
- SOFTWARE DEVELOPMENT/MAINTENANCE
- COMPUTER SYSTEM TRAINING

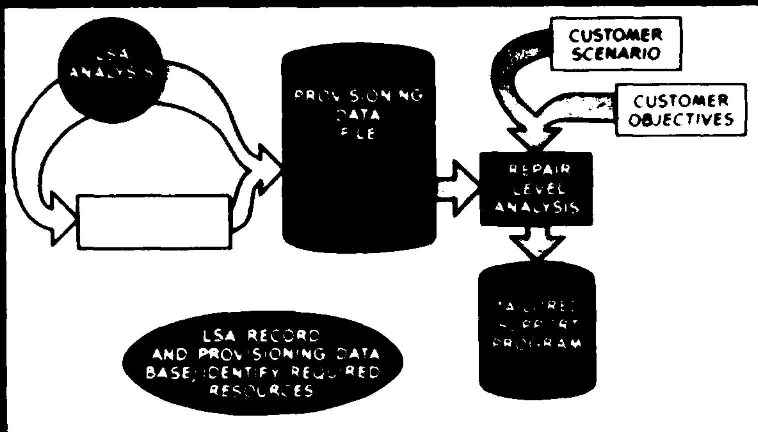
- COST AND DATA ANALYSIS
- MODEL DEVELOPMENT
- LOGISTICS RESEARCH
- OPERATIONS RESEARCH

LSA FLOW-DOWN REQUIREMENTS

RECOMMENDED PROCESS



SUPPORT RESOURCE VISIBILITY



SUPPORT ANALYSIS TRAINING

APPLIED INSTRUCTIONAL SYSTEM DEVELOPMENT:
- ANALYSIS OF LSA PROCESS
- REVIEW AND REVISION OF PROCEDURAL BASELINE
- ANALYSIS OF TRAINING REQUIREMENTS

DEVELOPMENT OF LSA TRAINING PROGRAM:
- COMPUTER LITERACY TRAINING
- LSA BASIC SKILLS TRAINING
- QUALITY CIRCLE PROGRAM

TRAINING INTERFACE TO LSA SYSTEMS

HUMAN ENGINEERING LSA SYSTEM

SUPPORT RESOURCE VISIBILITY (CONTINUED)

- IDENTIFIES AND QUANTIFIES SUPPORT RESOURCES
- INFLUENCES DESIGN TOWARD SUPPORTABILITY
- SELECTS AND DESIGNS OPTIMUM SUPPORT CONCEPT

REPAIR LEVEL ANALYSIS

- ECONOMIC ANALYSIS OF REPAIR ALTERNATIVES
- SELECTS OPTIMUM REPAIR CONCEPT
- HIGHLY SENSITIVE TO OPERATION SCENARIO

ASSESSING LSA TRAINING NEEDS
TRAINING LOGISTICS

CONSTRAINT DETERMINATION

- WHO ARE THE TRAINEES?
- HOW MANY PEOPLE NEED TO BE TRAINED?
- HOW LONG WILL IT TAKE TO TRAIN THEM?
- WHAT FACILITIES WILL BE AVAILABLE?
- WHAT ARE THE PROPOSED COST FACTORS?
- WHO WILL DEVELOP, IMPLEMENT, AND MANAGE THE TRAINING?

ASSESSING LSA TRAINING NEEDS
DECISION DETERMINATION

PROBLEM DETERMINATION

CURRENT STATUS	ORGANIZATIONAL PROBLEM	TRAINING PROBLEM
• APPLICATION OF EXISTING PROCEDURES PRODUCE UNEVEN RESULTS	✓	
• INCONSISTENT USE OF PROFESSIONAL TERMINOLOGY	✓	
• DATA INTERPRETATION PROBLEM		✓
SOLUTION	QUALITY CIRCLE	COURSE

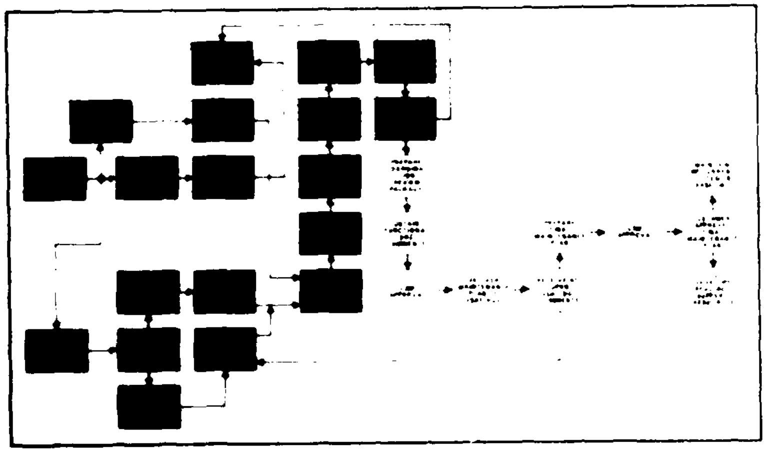
LSA TRAINING PROGRAM

COURSE SYLLABUS
- DEFINES STUDENT PREREQUISITES
- DEFINES LEARNING OBJECTIVES
- SPECIFIES REQUIRED READINGS

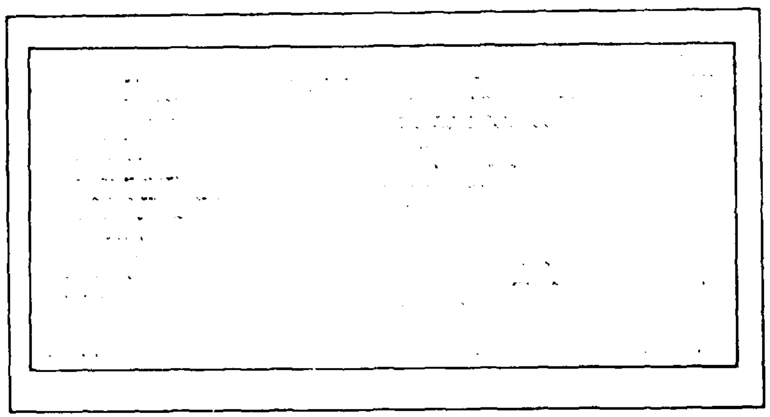
COURSE OUTLINE
- PROVIDES REQUIRED READING
- PROVIDES PRESENTATION COPIES
- PROVIDES COPIES OF QUIZZES

INSTRUCTORS, SUBJECT MATTER EXPERTS
- INTERNAL TO GROUP
- AVAILABLE FOR CONTINUING SUPPORT
- RESPONSIBLE FOR PROCEDURES

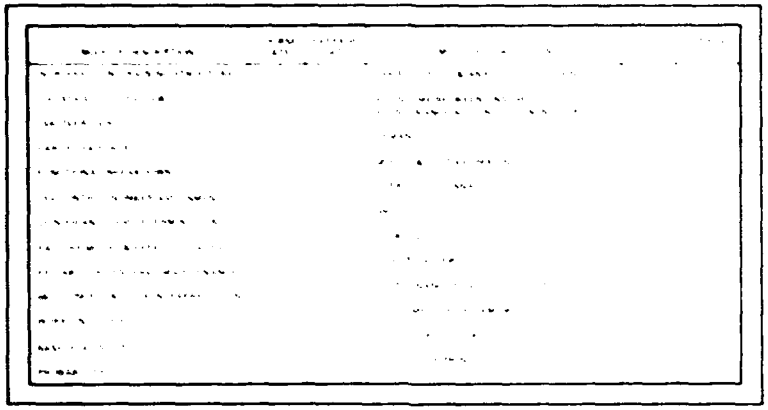
LSA MAJOR TASK BREAKDOWN



LSA TRAINING COURSE TOPICS

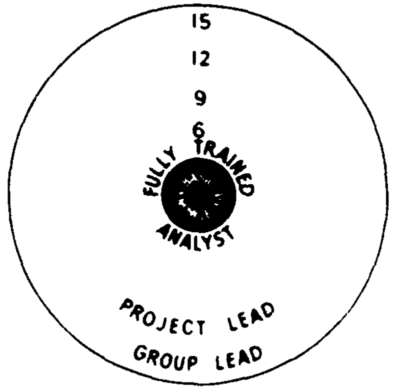


CAREER DEVELOPMENT RECORD



83 15120
6D

CAREER PROGRESSION MODEL

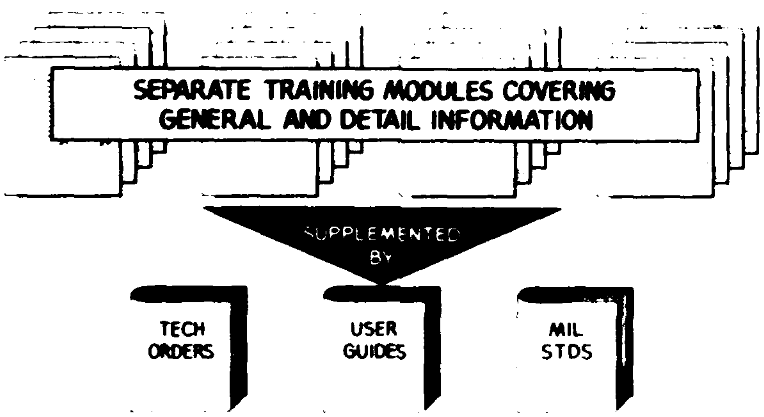


- RECRUITED WITH BASIC KNOWLEDGE
- TRAINED TO PERFORM ANALYSIS
- ACCURACY AND TIMELINESS OF PRODUCTS
- INCREASING FAMILIARITY WITH SUPPORT REQUIREMENTS
- IMPROVING QUALITY OF COMMUNICATION
- EXPANDING AWARENESS OF ANALYSIS PURPOSES
- INCREASING COMPREHENSION OF ILS GOALS

FUNDAMENTAL REQUIREMENT
WILLINGNESS TO ASSUME RESPONSIBILITY AND EXERCISE INITIATIVE

83 15121A
6A

SUPPORT ANALYST CAREER DEVELOPMENT RECORD (INTERNAL EDUCATION)



83-10720
6A

SUMMARY

DEVELOPING TOMORROW'S LSA ANALYSTS

- DEVELOP A CORPORATE STRATEGY FOR LSA MANAGEMENT
- RECRUIT BASIC KNOWLEDGE - TRAIN BASIC SKILLS
- PROMOTE VERTICAL AND HORIZONTAL COMMUNICATION
- STRESS PROFESSIONALISM

INVOLVE THE ANALYSTS

83-15722
11D

REAL TIME ILS

TOM KELLER

DEPUTY F/FB-111 AIS DEPT. MGR
WESTINGHOUSE INTEGRATED
LOGISTICS SUPPORT DIVISIONS
HUNT VALLEY, MD.

F-111-38

F-111 AIRCRAFT CONFIGURATIONS

F-111A - TACTICAL FIGHTER/BOMBER ALL WEATHER
F-111D - TACTICAL ALL WEATHER FIGHTER/BOMBER
F-111E - ELECTRONIC WARFARE
F-111F - TACTICAL ALL WEATHER FIGHTER/BOMBER
EF-111 - ELECTRONIC WARFARE
FB-111A BOMBER

F-111-40

DISCUSS REAL-TIME ILS CONCEPT

- STATE-OF-THE-ART SUPPORT CONCEPT
- MODERN ATE ARCHITECTURES
- OPERATOR/MAINTAINER ENHANCEMENTS
- SHORT WAR APPLICATION (NEAR/FAR TERM)

F-111-39

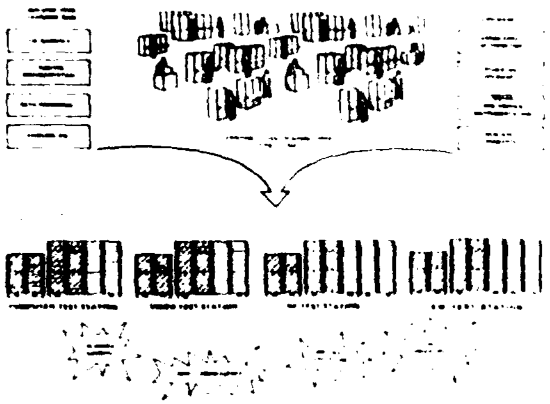
TEST SYSTEM TYPES AND QUANTITY VS SITE

BASE	F-111 MDS	EXISTING F-111 AIS TEST STATIONS	
		TYPES	QUANTITY
MOUNTAIN HOME	A	14	56
MOUNTAIN HOME	EF	*	*
PEASE	FB	12	15
PLATTSBURGH	FB	12	19
CANNON	D	9	58
LAKENHEATH	F	14	41
UPPER HEYFORD	E	14	39
UPPER HEYFORD	EF	*	*
CANNON (PROTOTYPE)	D		
TOTAL SAC & TAC		27	224
LOGISTICS			100
TOTAL			324

*EF COMBINED WITH A FOR EXISTING AIS

F-111-46

AIS TEST SYSTEMS REDUCED



CHARACTERISTICS

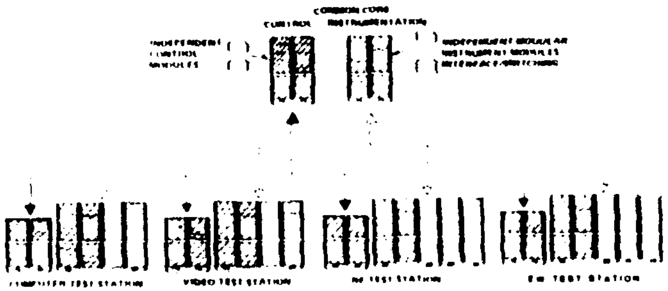
- EXISTING TEST METHODOLOGY
- PASSIVE INTERFACE TEST ADAPTERS
- UTILIZE PROVISIONED HARDWARE
- UTILIZE PROVEN SEASONED HARDWARE/SOFTWARE
- DISTRIBUTED PROCESSING
- DYNAMIC INTERACTIVE TRU TESTING
- ATLAS 716C
- IEEE-488
- MATE CIIL
- CENTRALIZED SWITCHING MATRIX
- FRIENDLY OPERATOR INTERFACE
- MAXIMIZED ATE SUPPORTABILITY
- EASY UPGRADING/EXPANSION
- EXISTING MATE MODULES

F/FB-111 PRESENT AIS VS F/FB-111 REPLACEMENT AIS

BASE	F-111 MDS	EXISTING F-111 AIS TEST STATIONS		REPLACEMENT AIS TEST SYSTEMS	
		TYPES	QUANTITY	TYPES	QUANTITY
MOUNTAIN HOME	A	14	56	4	8
MOUNTAIN HOME	EF	*	*	4	4
PEASE	FB	12	15	4	8
PLATTSBURGH	FB	12	16	4	8
CANNON	D	8	66	4	12
LAKENHEATH	F	14	61	4	12
UPPER HEYFORD	E	14	39	4	12
UPPER HEYFORD	EF	*	*	4	4
CANNON (PROTOTYPE)	D			4	6
TOTAL SAC & TAC		27	234	4	74
LOGISTICS			160		20
TOTAL			394		94

*EF COMBINED WITH A FOR EXISTING AIS

F/FB-111 AIS MODULAR GROUPS



CONTROL GROUP

IDENTICAL ON ALL FOUR TEST STATIONS
80" HIGH · 2-BAY CONTAINS:

- OPERATOR/MAINTAINER INTERFACE
- MULTIPLE POSITION CAPABILITY
- COMPUTER
- POWER CONTROL MONITOR
- MAGNETIC TAPE
- DISC
- PRINTER
- POWER SUPPLIES

COMMON CORE GROUP

SIMILAR ON ALL FOUR STATIONS
IDENTICAL ON COMPUTER AND VIDEO TEST STATIONS
IDENTICAL ON RF AND EW TEST STATIONS
76" HIGH · 2-BAY CONTAINS:

- LOAD ASSEMBLY
- MULTIFUNCTION UNIT
- WAVEFORM ANALYZER
- DIGITAL MULTIMETER
- DIGITAL WORD GENERATOR
- TMA DISTRIBUTED PROCESSOR
- PROGRAMMABLE AC POWER SUPPLY
- SWITCHING INTERFACE ASSEMBLY

PECULIAR GROUP

DIFFERENT ON EACH TEST STATION

76" HIGH · 2-BAY ON COMPUTER TEST STATION

76" HIGH · 2-BAY ON VIDEO TEST STATION

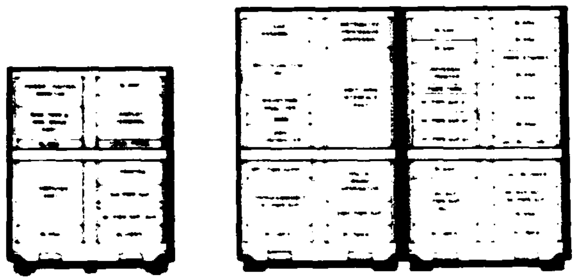
76" HIGH · 3-BAY ON RF TEST STATION

76" HIGH · 3-BAY ON EW TEST STATION

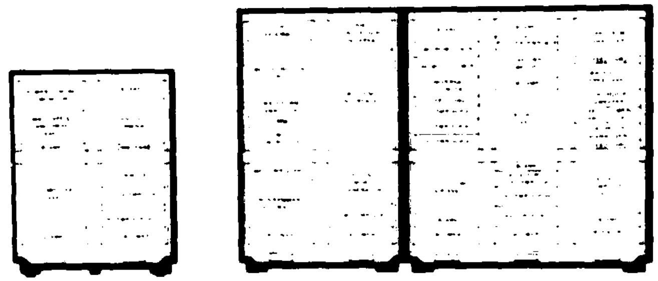
PECULIAR GROUP (CONTINUED)

- COUNTERS
- PROGRAMMABLE AC/DC POWER SUPPLIES
- PROGRAMMABLE SYNTHESIZERS
- UUT COOLING
- VIDEO FUNCTION/MONITORS
- VIDEO DISPLAY GENERATORS
- RF SOURCES
- MICROWAVE COUNTERS
- PEAK POWER METERS

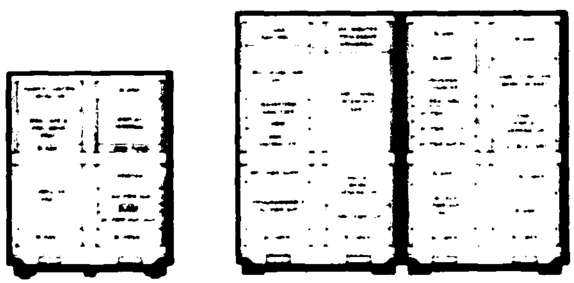
F/FB-111 AIS COMPUTER TEST STATION
3396B56G01



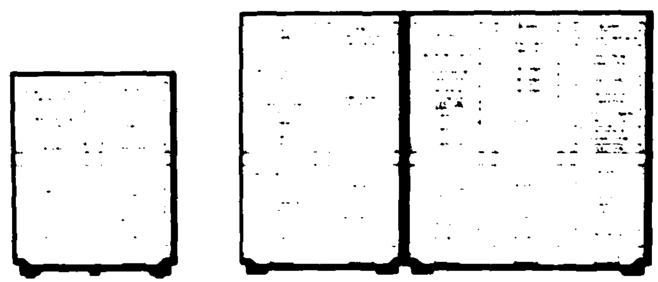
F/FB-111 AIS RF TEST STATION
3396B52G01



F/FB-111 AIS VIDEO TEST STATION
3396B57G01



F/FB-111 AIS EW TEST STATION
3396B51G01



CROSS TEST STATION TESTING

ILSD

UUT's	COMPUTER	VIDEO	RF	EW
41	X			
33		X		
46			X	
38				X
23	X	X		
122	X	X	X	X
303	186	178	168	160

SUPPORT FEATURES

ILSD

- SELF-TEST
- PATEC CALIBRATION
- OPERATOR/MAINTENANCE SAME PERSON
- INTERCHANGEABILITY OF TRU'S
- INTERCHANGEABILITY OF SRU'S MAXIMIZED

REDUCED TEST STATION TEST CAPABILITY

ILSD

IF PECULIAR GROUP FAILS, 145 UUT'S CAN BE TESTED ON MULTIPLE TEST STATIONS.

SUPPORT EQUIPMENT

ILSD

- CROSS TESTING CAPABILITY
- CANNIBALIZATION REALITY
- STABLE LONG-TERM PLANNING REALITY
- LCC REASONABLE

OPERATOR/MAINTAINER (HUMAN) ASPECTS

ILSD

TODAYS PROBLEMS :

- LOW SKILL LEVEL
- POOR TECHNICAL PUBLICATIONS
- TARDY CONFIGURATION MANAGEMENT
- COMPLICATED SUPPORT EQUIPMENT

F 111-84

NEW DEVELOPMENTS IN OPERATOR INTERFACE MEDIA

ILSD

- TOUCH PANEL CRT INTERACTION
- VIDEODISC
- HIGH RESOLUTION DISPLAY
- GRAPHICS GENERATION
- GRAPHICS/TEXT OVERLAY ONTO VIDEO
- VOICE SYNTHESIS
- SOFTWARE UTILITIES
- COMPUTER CONTROL
- MATE COMPATIBLE
- MODEM INTERFACE
- ELECTRONIC STORAGE OF TECH DATA

TODAY'S ELECTRONICS TECHNICIAN

ILSD

OVERWHELMED BY...

- INFORMATION
- TECHNOLOGY COMPLEXITY
- DIAGNOSTIC CHOICES

THE MACHINE CAN HELP ...

- SORT INFORMATION
- ORGANIZE THE COMPLEXITY
- GUIDE HIM THROUGH THE DECISIONS

MAINTENANCE AIDS (GUIDANCE)

ILSD

- OPERATOR PROMPTING KEYED TO ATE TEST IN PROGRESS
- MENU ACCESS TO ASSISTANCE WHEN ATE CALLS FOR OPERATOR ACTION
- ADDITIONAL DIAGNOSTIC TOOLS
  - HISTORIC CAUSES OF SIMILAR SYMPTOMS
  - ADDITIONAL OPERATOR-CONTROLLED TESTS
  - FUNCTIONAL OPERATION REVIEWS
  - SCHEMATICS
  - HISTORY OF LRU
  - FUTURE DIAGNOSTIC AIDS

MAINTENANCE MANAGEMENT INFORMATION

ILSD

- STATUS OF ALL MAJOR UNITS IN THE SHOP
- TIME SPENT ON REPAIR OF EACH UNIT
- PREVIOUS HISTORY OF A PARTICULAR LRU ENTERING THE SHOP
- EASIER AND MORE ACCURATE FILLING OUT OF MAINTENANCE ACTION AND SUPPLY FORMS
- POTENTIAL TO ACCESS OTHER DATA FROM OUTSIDE THE SHOP
- STANDARDIZED TERMINOLOGY · HOW MAL CODE

COMBINE TODAY'S TECHNOLOGY

ILSD

- MODERN ATE ARCHITECTURES
- OPERATOR/MAINTAINER ENHANCEMENTS

TODAY/FUTURE

ILSD

SHORT TERM WARS

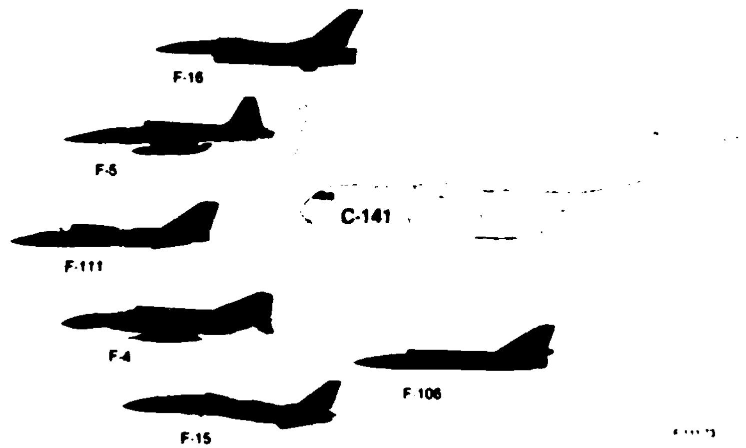
e.g.

- 7-DAY ISRAELI WAR
- GRENADA
- FALKLANDS

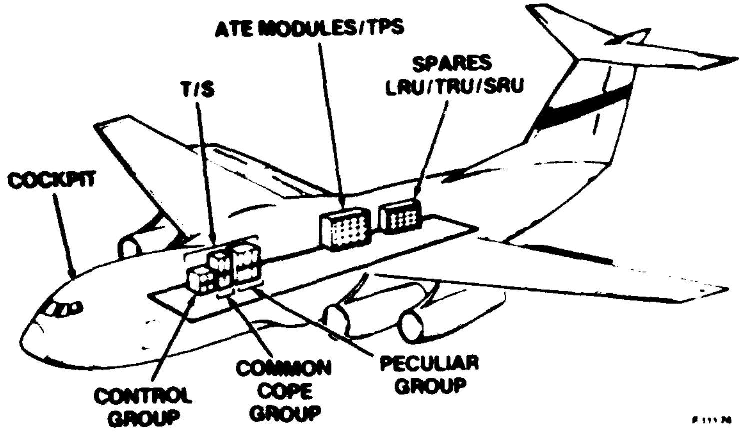
F 111-70

FLY IN SUPPORT WITH FIGHTERS/BOMBERS

ILSD



SUPPORT AIRCRAFT



SUPPORT AIRCRAFT ACTIVITY

- REPLACEMENT LRU READY
- CONFIGURE ATE
- RUN SELF-TEST
- SYSGEN
- HOOK UP ITA
- LOAD PROGRAM
- PULL POTENTIAL REPLACEMENT SRU'S (BASED ON RECORDED FAILURE DATA)

REAL TIME AIRCRAFT DIAGNOSIS

- ADDITIONAL RELIABLE BIT (LRU)
- TRANSMIT DATA TO SUPPORT AIRCRAFT

REAL TIME ILS

- UUT ARRIVES
- PERFORM QUICK GO/NO-GO TEST
- "GO TO" ANALYZED FAULT ANALYSIS TEST (FROM TRANSMITTED DATA)
- DETECT FAULTY SRU
- REPLACE FAULTY SRU (REPLACEMENT READY)
- RETEST
- PUT IN SPARES/AIRCRAFT

BENEFITS

ILSD

- NO REDUCTION OF NORMAL AIRCRAFT SUPPORT
- SUPPORT REAL TIME
- FEWER DEPLOYMENT AIRCRAFT NEEDED
- MOBILITY OF WEAPON SYSTEM INCREASED
- LESS COST

F-111-78

ACCELERATED ACQUISITION PROGRAMS

- ACCELERATED ACQUISITION PROGRAMS - TYPES
- IMPACT ON ILS
- ACCELERATING ILS ASPECTS
- INTERIM CONTRACTOR SUPPORT
- CONCLUSIONS

1

CHART 1 ON

DRCSM-PL

GOOD MORNING. IT IS REFRESHING TO NOTE THAT I AM TO ADDRESS ACCELERATED SUPPORTABILITY PLANNING JUST PRIOR TO OUR COFFEE BREAK. IN KEEPING WITH THE THEME OF MY PRESENTATION, AND THE SUBSEQUENT EVENT, I WILL ACCELERATE THROUGH THIS PRESENTATION IN THE PRESCRIBED TIME.

AS MANY OF YOU ARE AWARE, ACCELERATED ACQUISITION PROGRAMS HAVE BECOME A WAY OF LIFE. THESE PROGRAMS ARE GENERALLY CATEGORIZED AS THOSE THAT MOVE FROM APPROVAL OF A DETAILED SYSTEM SPECIFICATION, OR ENTRY INTO FULL-SCALE DEVELOPMENT, TO FIRST FIELDING IN SIGNIFICANTLY LESS THAN FIVE YEARS. CONTRARY TO WHAT YOU MAY HAVE READ OR HEARD FROM THE MEDIA, THIS CATOGORIZES THE BULK OF OUR ACQUISITION PROGRAMS.

I WILL BRIEFLY DESCRIBE THE MAJOR TYPES OF ACCELERATED ACQUISITION PROGRAMS, THEIR IMPACT ON ILS, WHAT WE CAN DO ABOUT IT, AND OFFER SOME GENERAL CONCLUSIONS.

CHART 1 OFF

ACCELERATED ACQUISITION PROGRAMS - TYPES

- **NON-DEVELOPMENTAL ITEM (NDI)**
  - COMMERCIAL "OFF-THE-SHELF"
  - DEVELOPED BY OTHER SERVICE/COUNTRY

MOST COMMON

- **QUICK REACTION CAPABILITY/PROGRAM - QRC/QRP**
  - QRC USUALLY FOR SIGINT, OFTEN HI TECH
  - QRP USUALLY FOR HIGH TECH LIGHT DIVISION (HTLD)
- **CONCURRENT PROGRAMS**
  - ELIMINATION OF ONE OR MORE ACQUISITION PHASES
  - COMBINING ACQUISITION PHASES
- **MILITARY ADOPTION OF COMMERCIAL ITEMS (MACI)**
  - VERIFY MILITARY SUITABILITY OF COMMERCIAL ITEMS
  - MODIFICATION/INTEGRATION OF COMMERCIAL ITEMS

CHART 2 ON DRCSM-PL

THE FOUR PRINCIPAL TYPES OF ACCELERATED ACQUISITION PROGRAMS ARE SHOWN HERE. ADDITIONALLY, PRODUCT IMPROVEMENTS ARE OFTEN CONSIDERED TO BE ACCELERATED PROGRAMS, HOWEVER, PRODUCT IMPROVEMENTS ARE NOT NECESSARILY DELIBERATE ACTIONS TO SAVE ACQUISITION TIME.

DOD AND SERVICE MATERIEL ACQUISITION POLICIES AND PROCEDURES, SUCH AS DOD DIRECTIVE 5000.1 AND AR 70-1, ESTABLISH A PROCESS FOR DEVELOPING A NEW WEAPON SYSTEM AND FOR INTRODUCING THE NEW SYSTEM INTO THE INVENTORY. THIS CLASSICAL PROCESS PROVIDES FOR STRUCTURED PHASES, SUCH AS D&V AND FULL SCALE ENGINEERING DEVELOPMENT, OF WHICH WE ARE ALL FAMILIAR WITH. IT IS IMPORTANT TO RECOGNIZE THAT THESE POLICIES AND PROCEDURES HAVE TO BE TAILORED TO FIT INDIVIDUAL REQUIREMENTS. AS SUCH, ALL MATERIEL ACQUISITION PROGRAMS ARE UNIQUE. IT IS ALSO IMPORTANT TO RECOGNIZE THAT THE CLASSICAL PROCESS ESTABLISHES CERTAIN ABSOLUTE REQUIREMENTS WHICH MUST BE MET IN STRUCTURING ANY PROGRAM.

CHART 2 CONT'D

CHART 2 CONT'D

[illegible] REQUIREMENT [illegible] WHEREVER AND WHENEVER [illegible] FOUR TYPES [illegible] THE TAILORING [illegible] PROGRAM, THE ABSOLUTE REQUIREMENTS MUST BE MET.

[illegible] ITEMS ARE, BY NATURE, [illegible] AND ARE THE MOST [illegible] THE [illegible] REQUIREMENT, WE [illegible] MARKET SURVEY TO DETERMINE THE FEASIBILITY [illegible] THE REQUIREMENT WITH NDI AND [illegible] TO PROCUREMENT. THIS PROCESS MAY APPEAR [illegible] SAY THAT WE OFTEN WRITE REQUIREMENTS AROUND AVAILABLE NDI. ACTUALLY, [illegible] AND ENCOURAGE [illegible] WHEN PRACTICAL [illegible]

CHART 2 CONT'D

WITH NDI PROGRAMS, THE MARKET SURVEY IS SOMEWHAT SYNONYMOUS WITH THE D&V PHASE. [illegible] WE TAILOR THE CLASSICAL PROCESS BY ELIMINATING THE FULL SCALE ENGINEERING DEVELOPMENT PHASE AND GREATLY REDUCE THE EFFORTS NORMALLY ASSOCIATED WITH THE D&V PHASE SUCH AS THE DEVELOPMENT OF PROTOTYPES.

SIGNAL INTELLIGENCE, OR SIGINT, SYSTEMS HAVE THE SOMEWHAT UNIQUE FEATURE THAT THE PEACE[illegible] AT LEAST EQUAL TO THE WARTIME ROLE. IN THIS AREA THE THREAT IS NOT ONLY REAL [illegible] IMMEDIATE. A NEW OR MODIFIED CAPABILITY IS OFTEN NEEDED YESTERDAY TO PREVENT [illegible] OF INTELLIGENCE. THE QRC PROCESS [illegible] PROGRAM MAY BE ALLOWED TO PROCEED AS RAPIDLY AS POSSIBLE [illegible] ACQUISITION PHASES WITHOUT THE NORMAL DOCUMENTATION AND DECISION REVIEWS [illegible] STILL [illegible] DESIGN PLAN ATTACHED. THE ARMY ACCEPTS THE [illegible]

CHART 2 CONT'D

CHART 2 CONT'D DRCSM-PL

THE QRP IS ANOTHER QUICK REACTION PROCEDURE AND WAS DEVELOPED FOR THE HIGH TECHNOLOGY LIGHT DIVISION. BECAUSE THIS PROCEDURE IS NEW, AND RECEIVES A LOT OF INTEREST, I WILL DISCUSS THE QRP AND THE HTLD SEPERATELY.

IN CONCURRENT PROGRAMS, ACQUISITION PHASES MAY BE BYPASSED, COMBINED, OR DELIBERATELY CONDUCTED IN PARALLEL, SUCH AS PRODUCTION OF THE END ITEM WHILE SYSTEM DEVELOPMENT CONTINUES. RDTE FUNDING MAY HAVE A LARGE OVERLAP WITH PRODUCTION FUNDING, WHICH IN ITSELF IS UNUSUAL. THESE PROGRAMS USUALLY REPRESENT THE LARGEST CHALLENGE TO ILS MANAGERS AS THEY ARE OFTEN LARGE, HIGH VISIBILITY PROGRAMS. ADDITIONALLY, THEY ARE OFTEN FOR FRONT-LINE COMBAT EQUIPMENT WHICH HAVE ESPECIALLY CRITICAL SUPPORTABILITY REQUIREMENTS.

THE ARMY HAS IMPROVED THE DEFINITION OF NDI TO CORRECT SOME PREVIOUS PROBLEMS WITH NDI. PREVIOUSLY, UNIQUE ASSEMBLEGES OF COMMERCIAL ITEMS WAS CONSIDERED TO BE NDI. HOWEVER, NDI WAS ALSO DEFINED TO EXCLUDE THE NEED FOR THE USE OF RDTE FUNDS.

CHART 2 CONT'D PAGE

CHART 2 CONT'D DRCSM-PL

THIS APPROACH FAILED TO RECOGNIZE THE RDTE ASPECTS OF SYSTEM INTEGRATION, OR SYSTEM ENGINEERING, WHICH RESULTED IN SIGNIFICANT PROBLEMS IN SEVERAL AREAS. THE IMPROVED DEFINITION PROVIDES FOR A STRUCTURED APPROACH FOR INTEGRATION OF COMMERCIAL ASSEMBLAGES AND PROPER FUNDING.

CHART 2 OFF

ACCELERATED ACQUISITION PROGRAMS

QRP – HIGH TECHNOLOGY LIGHT DIVISION

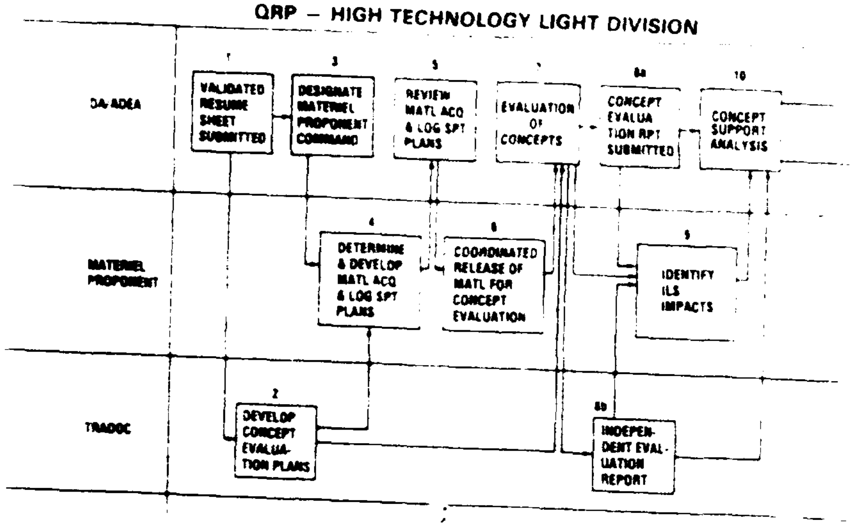


CHART 3 ON DRCSM-PL

THE ARMY IS FORMING A HIGH TECHNOLOGY LIGHT DIVISION TO MEET CERTAIN CURRENT AND FUTURE THREATS. THIS IS BEING ACCOMPLISHED THROUGH THE DEVELOPMENT OF NEW DOCTRINE, TACTICS, AND MATERIEL. IN THE MATERIEL AREA, WE ARE LOOKING AT BOTH NEW AND MODIFIED EQUIPMENT, AS WELL AS NEW CONCEPTS FOR FIELD UNIT [illegible] CONFIGURATIONS. THE 9TH INFANTRY DIVISION IS DESIGNATED FOR RECONFIGURATION TO A PILOT TYPE HTLD BY FY86. THE US ARMY DEVELOPMENT AND EMPLOYMENT AGENCY, OR ADEA, WHICH REPORTS TO HQDA, DCSOPS, HAS BEEN ESTABLISHED TO DEVELOP THE PROTOTYPE DIVISION.

TO DEVELOP THE HTLD, NEW CONCEPTS FOR DOCTRINE, TACTICS AND MATERIEL IS TESTED AND EVALUATED USING THE 9TH ID AS THE TEST BED. IT IS A "THINK TANK" TYPE OF OPERATION, WHICH ENCOURAGES FREE THOUGHT AND INNOVATION. IF ANYONE HAS A NEW IDEA FOR APPLICATION TO ANY ASPECT OF THE HTLD, THE IDEA WILL BE EVALUATED.

CHART 3 CONT'D

CHART 3 CONT'D DRCSM-PL

[illegible] SERVING AS A TEST BED FOR DEVELOPMENT OF THE HTLD, THE 9TH ID MUST [illegible] RETAIN THE CAPABILITY TO MEET ITS PRIMARY MISSION. IN OTHER WORDS, THE DIVISION [illegible] BE CAPABLE [illegible] DEPLOY AT ANY TIME TO ANY PLACE ON THE GLOBE.

[illegible] CONCEPTS ARE EVALUATED USING THE PROCEDURE SHOWN ON THIS CHART. CONCEPT [illegible] EVALUATION BY ADEA ARE INITIATED THROUGH A RESUME SHEET, WHICH IDENTIFIES HOW THE CONCEPT WILL BE TESTED AND THE MATERIEL REQUIREMENTS. ANY NUMBER OF EQUIPMENT TYPES AND QUANTITIES MAY BE REQUIRED. ADDITIONALLY, MATERIEL COULD BE STANDARD ARMY ITEMS, EXISTING DEVELOPMENTAL PROTOTYPES [illegible] OF WHAT IS REFERRED TO AS SURROGATE ITEMS, WHICH ARE ITEMS WHICH PROVIDE AN INTERIM FUNCTIONAL CAPABILITY, SORT OF [illegible] [illegible]

FROM THE RESUME SHEET, A MATERIEL PROPONENT IS DESIGNATED FOR EACH MATERIEL ITEM AND [illegible]

CHART 3 CONT'D

CHART 3 CONT'D DRCSM-PL

CONCEPT EVALUATION PLAN IS PREPARED. AT BLOCK 4, A PLAN IS PREPARED FOR ACQUIRING THE EQUIPMENT AND SUPPORTING THE MATERIEL AND TEST BED DURING THE CONCEPT TEST. UPON APPROVAL OF THESE PLANS, A TRAINING AND SAFETY RELEASE IS OBTAINED FOR THE MATERIEL AND TEST BED EVALUATION OF THE CONCEPT IS INITIATED. A CONCEPT EVALUATION REPORT AND AN INDEPENDENT EVALUATION REPORT ARE THEN PREPARED, WHICH ARE USED TO PREPARE AN ILS IMPACT ASSESSMENT. THE WHOLE THING IS THEN ANALYZED AND SENT TO THE DECISION AUTHORITIES. IF THE CONCEPT IS APPROVED FOR ADOPTION, THE QRP PROCEDURE IS THEN INITIATED TO ACQUIRE THE NEW, ADDITIONAL OR MODIFIED MATERIEL REQUIRED TO IMPLEMENT THE APPROVED CONCEPT [illegible] SYSTEMS.

CHART 3 OFF

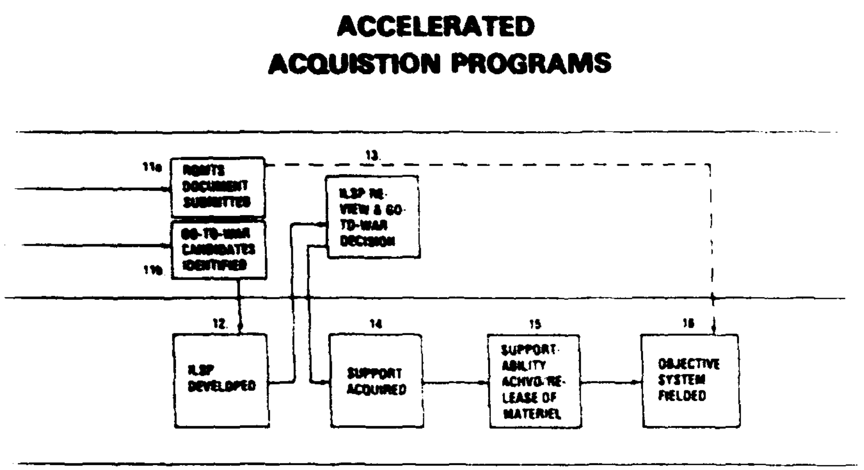


CHART 4 ON

ACQUISITION OF NEW OR MODIFIED MATERIEL REQUIRED TO IMPLEMENT A NEW CONCEPT IS ACCOMPLISHED THROUGH THE QRP, WHICH WAS DEVISED FOR THIS PURPOSE. THE QRP PROCEDURE IS ACTUALLY NOT SIGNIFICANTLY DIFFERENT FROM THE NORMAL ACQUISITION PROCESS. IF MATERIEL IS NDI, THEN NDI PROCEDURES ARE FOLLOWED. THE SAME IS TRUE FOR NEW OR MODIFIED EQUIPMENT. UNDER THE QRP, THE NORMAL PROCESS IS ACCELERATED TO THE MAXIMUM EXTENT. IN ADDITION, IF A WAVIER TO CERTAIN NORMAL ACQUISITION REQUIREMENTS WOULD SAVE TIME, THE WAIVER WOULD BE APPROVED IF RISKS ARE ACCEPTABLE. THE QRP DOES ALLOW FOR SOMEWHAT HIGHER RISKS THAN WOULD NORMALLY BE ACCEPTABLE. GENERATION, COORDINATION, AND APPROVAL OF QRP REQUIREMENTS DOCUMENTS IS ACCOMPLISHED UNDER MANDATORY TIME CONSTRAINTS. AN IPR IS HELD TO APPROVE THE ACQUISITION STRATEGY AND PROVIDE PROGRAM GO-AHEAD. THE DASHED LINE ON THIS CHART REPRESENTS THE QRP. THE CHART ALSO SHOWS UNIQUE ASPECTS OF THE HTLD UNTIL THE QRP PROVIDES THE OBJECTIVE SYSTEMS.

PENDING RECEIPT OF THE OBJECTIVE SYSTEMS FROM THE QRP, SOME OF THE SURROGATE ITEMS MAY OFFER AN IMPROVED CAPABILITY FOR THE 9TH ID'S COMBAT MISSION. THESE ITEMS ARE REFERRED TO AS GO-TO-WAR CANDIDATES, WHICH MEANS THAT IF THE 9TH ID DEPLOYS, THE ITEMS WOULD GO WITH THE

CHART 4 CONT'D

CHART 4 CONT'D

[illegible] THE ITEMS MUST THEN BE SUPPORTABLE AND [illegible] IN A POTENTIAL COMBAT ENVIRONMENT. THEREFORE, AN ILS PLAN [illegible] WHICH [illegible] BY THE DECISION AUTHORITY [illegible] FINAL DECISION FOR RETENTION OF THE SURROGATE ITEMS AS [illegible] EQUIPMENT. UNLESS [illegible] BY THIS DECISION PROCESS, NO OTHER EQUIPMENT USED IN THE CONCEPT EVALUATION TEST [illegible] WOULD BE DEPLOYED WITH THE 9TH ID. THIS PROCEDURE RESULTS IN AN IMPORTANT DISTINCTION BETWEEN THE QRP AND OTHER ACQUISITION PROCEDURES, SUCH AS NDI, SINCE IT ADVOCATES INTERIM [illegible] USE OF PROTOTYPES.

NOW, LET ME TURN TO THE ILS IMPACT OF ACCELERATED ACQUISITION PROGRAMS.

CHART 4 OFF

ACCELERATED ACQUISITION PROGRAMS

ILS IMPACT

TIME

- MOST ARMY ADP/MANAGEMENT SYSTEMS ARE, BY DESIGN, STRICT AND UNFORGIVING
- MOST ARMY FUNCTIONAL PROCESSES ARE HEEL-TO-TOE, ARE NOT FULLY AUTOMATED, AND IMMOVABLE

TWO EXAMPLES

- INITIAL PROVISIONING
- BASIS OF ISSUE PLAN (BOIP)

CHART 5 ON

BY FAR, THE SINGLE BIGGEST IMPACT OF ACCELERATED ACQUISITION PROGRAMS ON ILS IS THAT OF TIME. OF COURSE, THIS IS NO SURPRISE. THE MANAGEMENT OF TIME AND EVENTS IS A MAJOR ROLE OF ILS MANAGERS. WHEN PROGRAMS ARE ACCELERATED, TIME IS JUST THAT MUCH LARGER A MANAGEMENT TASK. IT IS ESPECIALLY CRITICAL TO THE ILS MANAGER, DUE TO THE ADP SYSTEMS AND FUNCTIONAL PROCEDURES WHICH MUST BE PASSED THROUGH TO ESTABLISH LOGISTIC SUPPORT FOR A COMBAT UNIT AND ENTER A NEW ITEM INTO THE ARMY MISSION EQUIPMENT INVENTORY.

OUR ADP SYSTEMS ARE DESIGNED TO BE STRICT, IN ORDER TO INSURE CORRECT AND COMPLETE DATA AT EACH STEP. MOST OF THEM ARE NEAR SATURATION, DUE TO SHEER VOLUME OF OUR BUSINESS. OUR FUNCTIONAL PROCESSES ARE TIME CONSUMING, MANPOWER INTENSIVE, AND NOT WELL SUITED TO STEAMROLLING THROUGH. THIS IS IN PART DUE TO DIVERSE RESPONSIBILITIES BETWEEN MAJOR ARMY COMMANDS, AND A CRITICAL SHORTAGE OF TRAINED AND EXPERIENCED PEOPLE ACROSS THE ARMY. WE ARE WORKING TO SOLVE THESE SIGNIFICANT SYSTEMIC PROBLEMS, BUT SOLUTIONS ARE NOT CLOSE AT HAND. THE FACT THAT WE ARE IN THE LARGEST FORCE MODERNIZATION PERIOD IN ARMY HISTORY COMPOUNDS THE PROBLEMS FACING THE ILS MANAGER. I WILL HIGHLIGHT TWO EXAMPLES OF WHAT WE ARE UP AGAINST.

CHART 5 OFF

INITIAL PROVISIONING

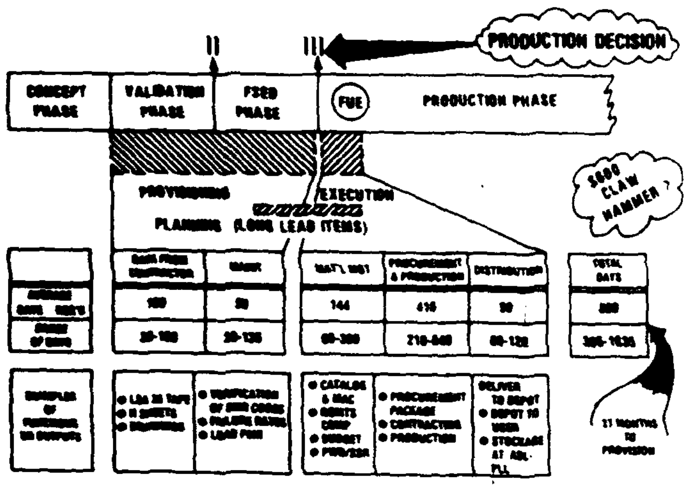


CHART 6 ON

THIS IS A SUMMARY TYPE CHART OF THE INITIAL PROVISIONING PROCESS. MOST OF YOU ARE LIKELY FAMILIAR WITH AT LEAST SOME ASPECTS OF INITIAL PROVISIONING, SINCE IT INVLOVES BOTH CONTRACTOR AND ARMY EFFORTS. IT REPRESENTS BOTH A FORMIDABLE FUNCTIONAL PROCESS AND AN ADP MONSTER. THE TIME IT TAKES TO GET THROUGH THE SYSTEM IS PROPORTIONAL TO THE NUMBER OF UNIQUE REPAIR PARTS AND ASSEMBLEGES IN A NEW MATERIEL SYSTEM. EVEN THE SIMPLEST ITEMS WILL TAKE OVER A YEAR. ON AVERAGE, WE CAN EXPECT OVER TWO YEARS FROM START TO FINISH. OBVIOUSLY, WE HAVE A BASIC PROBLEM IF MATERIEL IS DELIVERED 6-12 MONTHS AFTER PROGRAM INITIATION, SUCH AS WITH SOME NDI AND ORC. WE HAVE AN EXTENSIVE EFFORT UNDERWAY TO STREAMLINE THE OVERALL PROCESS. ADDITIONALLY, OUR SUBORDINATE ACTIVITIES HAVE DEVELOPED INNOVATIVE PROCEDURES TO MEET THE SCHEDULE DEMANDS OF ACCELERATED PROGRAMS WITH MINIMAL DISRUPTION OF SUPPLY PROCEDURES, AT THE COMBAT UNIT LEVEL. THE PROVISIONING PROCESS IS VERY SENSITIVE TO DESIGN OR CONFIGURATION CHANGES AND THE ACCURACY OF CONTRACTOR DATA. ANY CHANGE TO REPAIR PARTS OR CONTRACTOR DATA AND ITS USUALLY BACK TO THE STARTING GATE. WE ALSO HAVE TO BE VERY SENSITIVE TO THE

CHART 6 CONT'D

FACT THAT THE MORE WE COMPRESS AND EXPEDITE THE PROVISIONING PROCESS, THE GREATER THE RISK FOR THE 600 DOLLAR CLAW HAMMER. AS EVIDENCED BY RECENT MEDIA EVENTS, WE CAN DO A 99.9% SUPER JOB IN THE PROVISIONING PROCESS, BUT THE .1% WILL RECEIVE ALL THE ATTENTION.

CHART 6 OFF

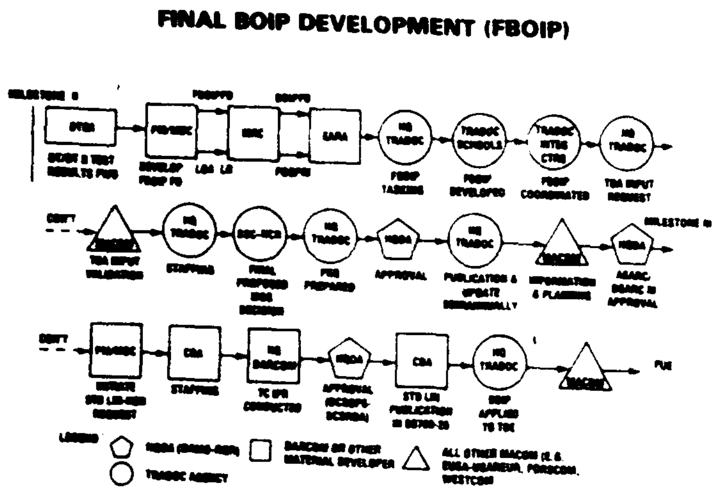


CHART 7 ON

THE BASIS OF ISSUE PLAN PROCESS IS ONE MANY OF YOU MAY NOT BE FAMILIAR WITH, AS IT IS ALMOST ENTIRELY INTERNAL TO THE ARMY. I'M SURE YOU WILL BE RELIEVED TO KNOW I AM NOT GOING TO TALK THROUGH THIS BEAST. IT IS SHOWN TO INDICATE ANOTHER MOUNTAIN WE MUST CLIMB. ACTUALLY, IT IS ONLY HALF THE STORY. THERE'S ANOTHER CHART LIKE THIS ONE THAT GETS US TO MILESTONE II, WHERE THIS ONE BEGINS.

THE BOIP IS A VERY IMPORTANT DOCUMENT. BASICALLY, FOR A NEW WEAPON SYSTEM, THE BOIP DETERMINES WHAT ARMY UNITS WILL RECEIVE THE MATERIEL IN WHAT QUANTITIES, WHAT ASSOCIATED EQUIPMENT, SUCH AS TEST EQUIPMENT, GENERATORS, AND TRUCKS, WILL BE NEEDED, HOW MANY ADDITIONAL PEOPLE WILL BE NEEDED TO OPERATE AND MAINTAIN THE EQUIPMENT, AND WHAT KIND OF SKILLS THE PEOPLE MUST POSESS. THE MISSION OF EACH ARMY UNIT MUST BE CONSIDERED, BOTH ACTIVE AND RESERVE, AS WELL AS THE UNIT EQUIPMENT AND PERSONNEL ALREADY ON HAND. IT'S A VERY COMPLEX UNDERTAKING WHICH IS HIGHLY MANPOWER EXTENSIVE AND DIFFICULT TO ACCELERATE. IT IS USUALLY NOT POSSIBLE TO GET TO THE

CHART 7 CONTINUED

CHART 7 CONTINUED

END IN LESS THAN 12-18 MONTHS. ONLY IN VERY RARE INSTANCES CAN A NEW ITEM BE FIELDED WITHOUT COMPLETION OF THE BOIP AND THE SUBSEQUENT UNIT EQUIPMENT AUTHORIZATION DOCUMENT, REFERRED TO AS THE TOE OR MODIFIED TOE. THE BOIP PROCESS IS ALSO DEPENDENT ON CONTRACTOR DATA. FOR EXAMPLE, THE PERSONNEL AND SKILL INFORMATION IN THE BOIP IS DERIVED FROM THE DATA PROVIDED BY CONTRACTOR IN THE LSAR.

AS WITH INITIAL PROVISIONING, THE BOIP PROCESS DOES NOT LEND ITSELF TO ACCELERATED ACQUISITION PROGRAMS. IT IS A FORMIDABLE OBSTACLE FOR THE ILS MANPOWER TO OVERCOME, AS THE PROCESS CROSSES MAJOR ARMY COMMAND LINES AND IS ONLY MINIMALLY AUTOMATED.

THERE ARE OTHER FUNCTIONAL PROCESSES THAT MAKE THINGS INTERESTING FOR THE ILS MANAGER. THE ONE COMMON DEMONINATOR IS TIME. THERE'S NEVER ENOUGH WITH ANY ACQUISITION PROGRAM. BEFORE I MOVE ON TO WHAT THE ILS COMMUNITY CAN DO TO OVERCOME THE MANY OBSTACLES PRESENTED WITH PROGRAM ACCELERATION, THERE IS ONE OF THE OTHER FUNCTIONAL PROCESSES THAT NEEDS TO BE RECOGNIZED, AND

CHART 7 CONTINUED

CHART 7 CONTINUED

THAT IS THE BUDGET PROCESS. IT CAN BE THE MOST DIFFICULT OF ALL. IT CAN ALSO BE OVERCOME WITH EASE. IF SUFFICIENT FUNDS ARE PROGRAMMED AND PROVIDED IN THE FRONT-END, THE BUDGET PROCESS IS NOT A PROBLEM. THAT'S A GOOD LEAD INTO THE NEXT SLIDE.

CHART 7 OFF

ACCELERATED ACQUISITION PROGRAMS

ACCELERATING ILS ASPECTS

REQUIRES INTENSE ILS MANAGEMENT

- **PLANNING**
  - ILS MUST BE PART OF DEVELOPING ACQUISITION STRATEGY
  - DOCUMENT WHAT MUST BE PROVIDED AT DEPLOYMENT
  - ILS PLAN TO PROVIDE REQUIRED SUPPORT AT DEPLOYMENT AND SUBSEQUENT LIFE CYCLE SUPPORT
- **FUNDING**
  - ADDITIONAL GOVERNMENT AND CONTRACTOR MANAGEMENT AND FUNCTIONAL PERSONNEL
  - ADDITIONAL TEST ARTICLES
  - CONTRACTOR INCENTIVES
  - INTERIM SUPPORT
- **INNOVATION**
  - GOVERNMENT AND CONTRACTOR
  - TAILOR TO SPECIFIC CIRCUMSTANCE

CHART _8_ ON DRCSM-PL

THESE ARE WHAT I CONSIDER THE ESSENTIAL ACTIONS WHICH MUST BE ACCOMPLISHED TO ENSURE A SUPPORTABLE AND SUSTAINABLE WEAPON SYSTEM IS FIELDED. THE ACTIONS MUST BE ACCOMPLISHED FOR ALL ACQUISITION PROGRAMS, BUT ARE ABSOLUTLY ESSENTIAL FOR ACCELERATED PROGRAMS, SINCE FOR THESE PROGRAMS THERE IS NO TIME FOR RESTARTS OR CATCH-UP. INTENSE ILS MANAGEMENT IS ALSO REQUIRED AND, OF COURSE, PLANS MUST BE EXECUTED.

WE IN DARCOM INSIST THAT ILS MUST BE A PARTNER IN DEVELOPING THE ACQUISITION STRATEGY. THIS IS WHERE THE DECISION IS MADE REGARDING ACQUISITION PROGRAM SCHEDULE AND TYPE. WE RECOGNIZED THAT SUFFICIENT ATTENTION HAD NOT BEEN GIVEN TO ILS IN SOME PAST ACQUISITION STRATEGIES, SO COMMAND POLICY HAS BEEN ESTABLISHED REQUIRING FULL CONSIDERATION OF ILS IN FORMULATING THE ACQUISITION STRATEGY. THIS MEANS THAT FOR EACH ACQUISITION ALTERNATIVE, ILS RISKS, IMPACTS, AND CONCURRENT STRATEGIES WILL BE CONSIDERED.

CHART _8_ CONT'D

CHART _8_ CONT'D DRCSM-PL

AN ACQUISITION STRATEGY WILL NOT BE SELECTED UNLESS ILS RISKS ARE ACCEPTABLE AND AN ACCEPTABLE LEVEL OF SUPPORT CAN BE PROVIDED AT DEPLOYMENT. LTG MOORE, DARCOM'S DEPUTY COMMANDING GENERAL FOR RESEARCH, DEVELOPMENT AND ACQUISITION, EMPHASIZED THIS POLICY TO ALL DARCOM SUBORDINATE COMMANDS AND ACTIVITIES BY LETTER, DATED 4 NOVEMBER 1983.

THIS LEADS ME TO A SIGNIFICANT IMPROVEMENT IN ARMY ILS POLICY. WITH PUBLICATION OF A REVISED AR 700-127 IN MAY 1983, WE NOW REQUIRE THAT THE MINIMUM ACCEPTABLE LEVEL OF ORGANIC SUPPORT REQUIRED AT DEPLOYMENT BE FORMALLY ESTABLISHED BY MILESTONE II. FOR NDI, THAT MEANS AT THE NDI DECISION POINT. THIS NEW POLICY REQUIREMENT PLUGS A PREVIOUS POLICY GAP. PREVIOUSLY, THERE WAS NO MINIMUM SUPPORT REQUIREMENT. AS A RESULT, 100% OF ORGANIC LOGISTICS WAS IN THEORY REQUIRED. SINCE THIS IS IMPOSSIBLE WITH MOST ACCELERATED ACQUISITION PROGRAMS, ACQUISITION MANAGERS SOMETIMES JUST

CHART _8_ CONT'D

CHART _8_ CONT'D DRCSM-PL

IGNORED 100% OF EVERYTHING. EACH MANAGER WAS LEFT TO HIS OWN DEVICES. WHETHER OR NOT THE RESULTING LEVEL OF SUPPORT PROVIDED AT DEPLOYMENT WAS ACCEPTABLE WAS OFTEN NOT RAISED AS AN ISSUE UNTIL DEPLOYMENT. SOME ACQUISITION MANAGERS DEVELOPED GREAT ILS PLANS TO PROVIDE THE FULL LEVEL LOGISTIC SUPPORT JUST AS THE POLICY REQUIRED. HOWEVER, LIKE THE POLICY ITSELF, THE PLANS WERE UNEXECUTABLE.

THE NEW POLICY RECOGNIZES THE REAL WORLD. WE STILL DESIRE 100% ORGANIC LOGISTIC SUPPORT BELOW DEPOT LEVEL FOR EQUIPMENT USED IN POTENTIAL HOSTILE ENVIRONMENTS, BUT ACCEPT THE FACT THAT RISKS ARE NORMALLY ACCEPTABLE FOR SOMETHING LESS THAN DESIRED FOR AN INTERIM PERIOD OF TIME. THE MANDATORY LEVEL OF SUPPORT THAT MUST BE PROVIDED IS DETERMINED ON A CASE BY CASE BASIS. WITH THE LOGISTICS BASELINE, OR THRESHOLD, THE ILS MANAGER CAN DEVELOP THE ILS PLAN TO MEET THE BASELINE REQUIREMENT AND TRANSITION TO THE DESIRED LIFE CYCLE

CHART _8_ CONT'D

CHART 8 CONT'D

SUPPORT AS SOON AS POSSIBLE. IT IS, OF COURSE, OUR OBLIGATION TO CONVEY THE BASELINE REQUIREMENT TO THE CONTRACTOR.

WE ALSO RECOGNIZE THAT MEETING THE LOGISTICS BASELINE MAY REQUIRE ADDITIONAL FUNDS FOR BOTH GOVERNMENT AND CONTRACTOR ILS EFFORTS. WE ARE PLACING CONSIDERABLE COMMAND EMPHASIS ON ADEQUATELY FUNDING THE ILS ASPECTS OF ALL ACQUISITION PROGRAMS.

ABOVE ALL, ACCELERATED PROGRAMS REQUIRE SOME INNOVATION TO OVERCOME OBSTACLES SUCH AS THOSE PREVIOUSLY DISCUSSED.

I MENTIONED THAT WE CAN ACCEPT LESS THAN THE DESIRED LOGISTIC SUPPORT FOR INTERIM PERIODS OF TIME. RATHER THAN INSISTING ON THE WHOLE PIE, WE DETERMINE HOW BIG A PIECE IS MANDATORY. WE WILL WAIT FOR THE REST OF THE PIE. THE INTERIM SUPPORT PROCEDURE MOST OFTEN USED IS INTERIM CONTRACTOR SUPPORT.

CHART 8 OFF

ACCELERATED ACQUISITION PROGRAMS

INTERIM CONTRACTOR SUPPORT

- PRACTICAL SOLUTION TO ACCELERATED ACQUISITIONS
- BASELINES MUST BE ESTABLISHED AND MET
  - DON'T ALWAYS NEED 100% AT DEPLOYMENT
  - MUST BE ABLE TO ACHIEVE BASELINE
- INTERIM SUPPORT MECHANISMS MUST WORK UNDER LIMITED OR FULL WARTIME CONDITIONS
- CONTRACTOR CAPABILITIES AND LIMITATIONS MUST BE RECOGNIZED
- WHEN PROPERLY PLANNED FOR AND USED, INTERIM CONTRACTOR SUPPORT CAN MEET ILS OBJECTIVES AND REQUIREMENTS
- TRANSITION TO DESIRED SUPPORT CONCEPT SHOULD OCCUR AS SOON AS PRACTICAL

CHART 9 ON

INTERIM CONTRACTOR SUPPORT IS A PRACTICAL SOLUTION TO ACCELERATED ACQUISITION PROGRAMS. WE MUST ALSO RECOGNIZE THAT IT IS NOT A PANACEA. AS LONG AS WE ARE AT PEACE, AND OUR EQUIPMENT IS NOT PLACED IN A HOSTILE ENVIRONMENT, THERE IS NEGLIGIBLE RISK WITH CONTRACTOR SUPPORT. OBVIOUSLY, THERE IS CONSIDERABLE RISK THAT THIS WILL NOT BE THE CASE. RECENT GLOBAL EVENTS SERVE TO REMIND US THAT MILITARY UNITS MAY BE CALLED UPON AT ANY TIME. WE MUST ASSUME THAT EQUIPMENT WE PLACE IN THE HANDS OF THE SOLDIER MAY BE PLACED IN A WARTIME ENVIRONMENT IMMEDIATELY AFTER DEPLOYMENT. THE INTERIM SUPPORT PROCEDURE MUST FUNCTION UNDER THESE CONDITIONS.

AGAIN, THE ACCEPTABLE RANGE AND DEPTH OF CONTRACTOR SUPPORT CAN ONLY BE DECIDED ON A CASE BY CASE BASIS. FOR COMBAT ARMS EQUIPMENT, CONTRACTOR SUPPORT AT ORGANIZATIONAL LEVEL WOULD NOT NORMALLY BE ACCEPTABLE, AND IS USUALLY TOO HIGH A RISK FOR FORWARD INTERMEDIATE SUPPORT LEVELS. ON THE OTHER HAND, FORWARD CONTRACTOR SUPPORT MAY BE PERFECTLY ACCEPTABLE FOR

CHART 9 CONT'D

CHART 9 CONT'D

EQUIPMENT USED IN REAR AREAS OR FIXED STATIONS. AS WITH ALMOST EVERY OTHER SUBJECT ASSOCIATED WITH ILS, THE KEY IS RECOGNITION OF THE CONSTRAINTS AND PROPER EARLY PLANNING.

CHART 9 OFF

ACCELERATED ACQUISITION PROGRAMS

CONCLUSIONS

- ILS MUST BE CONSIDERED UP FRONT
  - REQUIRES SPECIFIC GOVERNMENT ACTION
  - REQUIRES INNOVATIVE CONTRACTOR RESPONSE
- ILS MANAGERS MUST PROVIDE FOR CONCURRENT ACCELERATION OF ILS PROGRAM (GOV'T AND CONTRACTORS)
- THE PERCEPTION THAT ILS CAN ONLY BE ADDRESSED AFTER THE FACT IS A MYTH

THE MISSION OF THE RECEIVING UNIT MUST BE THE ULTIMATE CONSIDERATION

CHART 10 ON

DRCSM-PL

THERE ARE NO STARTLING REVELATIONS IN MY CONCLUSIONS. LET ME SUMMARIZE BY QUOTING GENERAL KEITH FROM AN ARTICLE CONTAINED IN THE OCTOBER 1983 ARMY GREEN BOOK.

" NOW THAT IMPROVED ILS POLICY, PROCEDURES, AND OPERATING SYSTEMS ARE ALMOST FULLY IN PLACE, WE MUST DOUBLE OUR EFFORTS TO MAKE THEM FUNCTION PROPERLY. WHILE WE MAY BE ABLE TO CORRECT SOME ILS SHORTFALLS AFTER SYSTEM FIELDING, GIVEN THE TIME AND MONEY, THIS IS TOO LATE FOR THE LINE SOLDIER WHO MAY HAVE TO FIGHT THE DAY AFTER HE GETS HIS NEW GEAR. I AM TOTALLY DEDICATED TO ASSURING THAT THE ARMY'S ABILITY TO WIN IS NOT CONSTRAINED BY FAILURE TO DO THE ILS JOB RIGHT AS WE ACQUIRE OUR NEW EQUIPMENT."

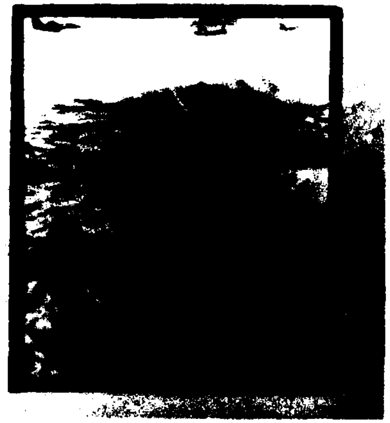
THANK YOU

CHART 10 OFF

TAC-SON 320-82
ADVANCED TACTICAL SURVEILLANCE SYSTEM

CONTINUOUS RELIABLE CURRENT DEPICTION OF AIR SPACE

- DETECTION (POSITION ALT HEADING, IDENTITY & FLIGHT
- CONTINUOUS TRACKING
- EXCHANGE OF AIR ACTIVITY INFORMATION BETWEEN
  - USERS
  - OTHER SERVICES
  - ALLIED NATIONS
- IDENTITY & CLASSIFICATION
- CORRELATION OF SENSOR TRACKS WITH INPUTS FROM EXTERNAL SOURCES



ADVANCED TACTICAL RADAR

PRESENTED BY
MR J SIMONS

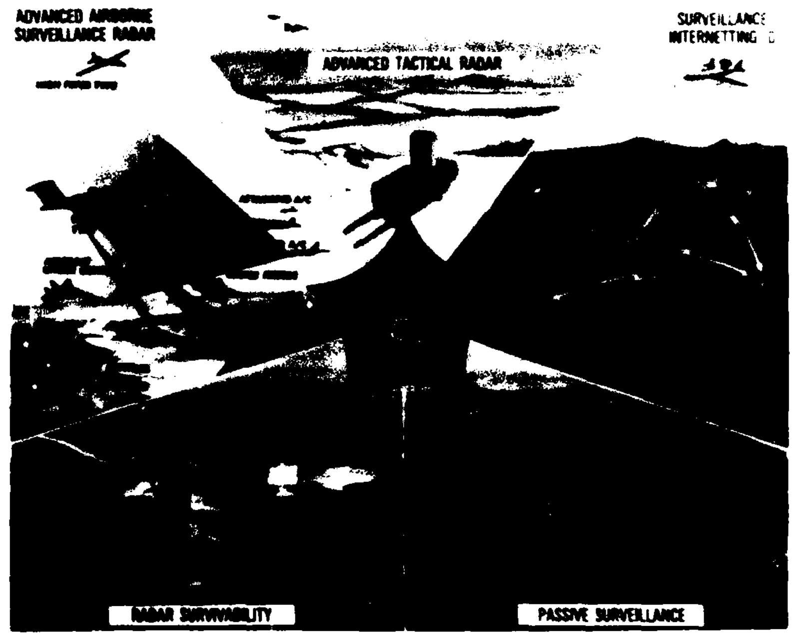
ADVANCED TACTICAL RADAR

SYSTEM OVERVIEW

SYSTEM FEATURE

SYSTEM PARAMETERS

- CLEAR RANGE NM
- ECM RANGE NM
- FREQUENCY BAND
- TARGET CAPACITY TRACKS



ADVANCED TACTICAL RADAR PROGRAM

YOM KIPPUR WAR

ALTERNATIVE SURVEILLANCE

DEVELOPMENT

ANTENNA CONCEPTUAL DES & DEV

ADVANCED TACTICAL RADAR DEV

1973 1974 | 1975 1980 | 1981 1985

PRESENT GCI RADAR LIMITATIONS

COVERAGE INADEQUATE TARGET DETECTION & TRACKING IN MODERN HOSTILE ENVIRONMENT

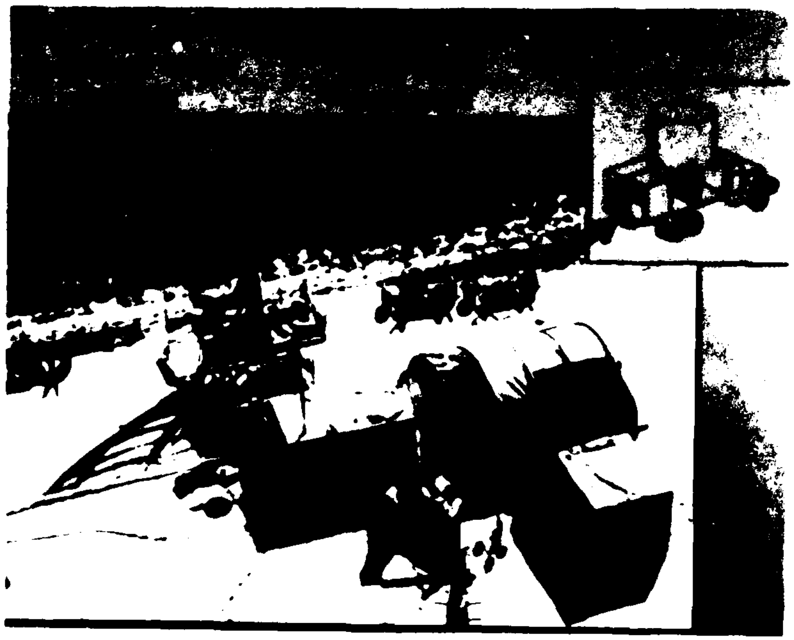
TRANSPORTABILITY EXISTING TPS-43 RADAR REQUIRES EXCESSIVE AIRLIFT FOR RADAR SUPPORT

MOBILITY TPS-43 REQUIRES 2 HOURS SET-UP MOVE
CANNOT MAINTAIN PACE OF MOBILE ARMY UNITS

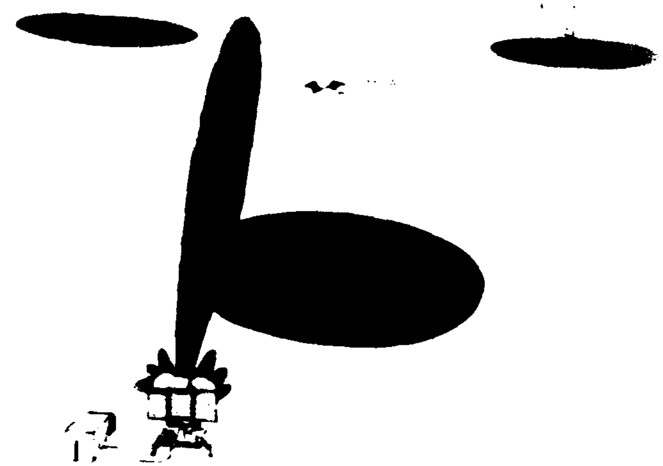
SURVIVABILITY TPS-43 LACKS MOBILITY, IS VULNERABLE TO ESM/ARM DETECTION

MAINTAINABILITY REQUIRES EXCESSIVE LOGISTICAL SUPPORT, 1960 TECHNOLOGY VS MODERN BITE, REDUNDANCY, & RELIABLE PARTS.
MANY RADARS 20 YEARS OLD

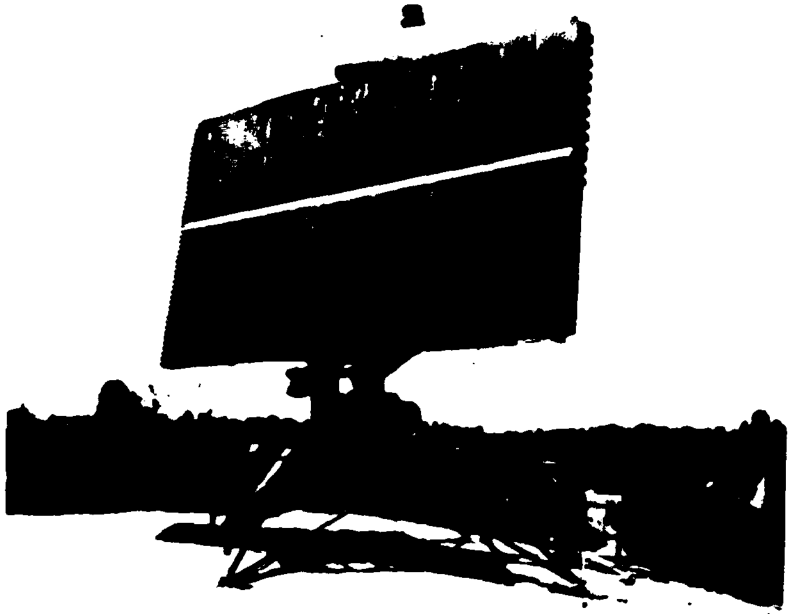
MINIMAL MANNING REQUIRES LARGE SITE/NUMBER OF PEOPLE FOR SUPPORT

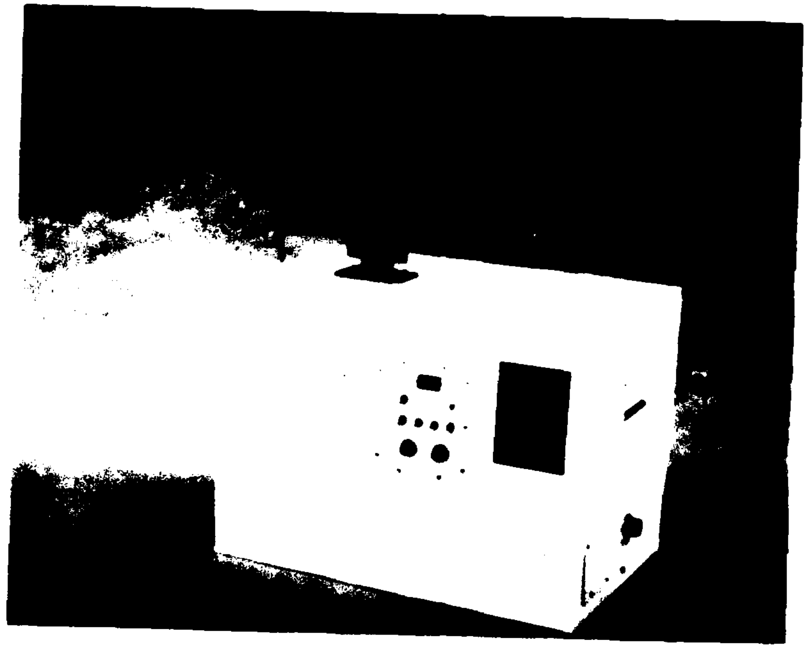


ANTI-ARMS DECOYS



LOW SIDELOBE ANTENNA





ADM SYSTEM PERFORMANCE REQUIREMENTS

- WARTIME VOLUMETRIC COVERAGE BOUNDED AS FOLLOWS
  - 100 NM MINIMUM ECM RANGE
  - 200 NM INSTRUMENTED CLEAR RANGE
  - 360 DEGREE AZIMUTHAL COVERAGE
- AUTOMATIC TARGET TRACKING AS FOLLOWS
  - 1000 TARGETS TOTAL
  - 150 TARGETS IN HIGH ACCURACY TRACKS
  - FULL COMPATIBILITY WITH ATS
- SINGLE VEHICLE MOBILITY AS FOLLOWS
  - ON BOARD AUTOMATIC NORTH ALIGNMENT
  - FIVE MINUTE 'TEAR DOWN' OR MOVE TIME
  - FIFTEEN MINUTE SETUP TIME

ATR CAPABILITIES

COVERAGE: -1° TO + 20° x 360° TO 100NM AGAINST SIMULTANEOUS CHAFF & ACTIVE JAMMING WITH 1000 TRACK LOAD
150 NM BENIGN TRACK

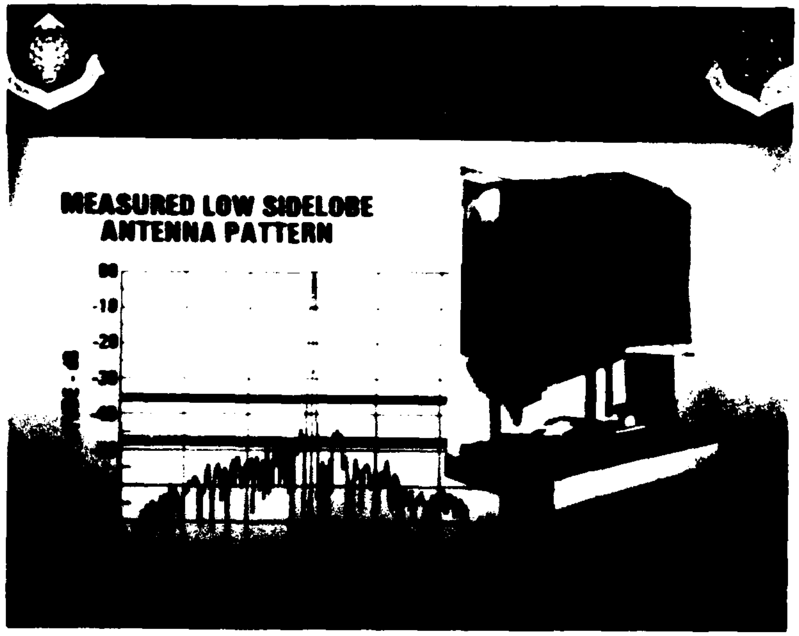
SURVIVABILITY: SPREAD SPECTRUM WAVEFORMS, LOW PEAK POWER, LOW ANTENNA SIDELOBES

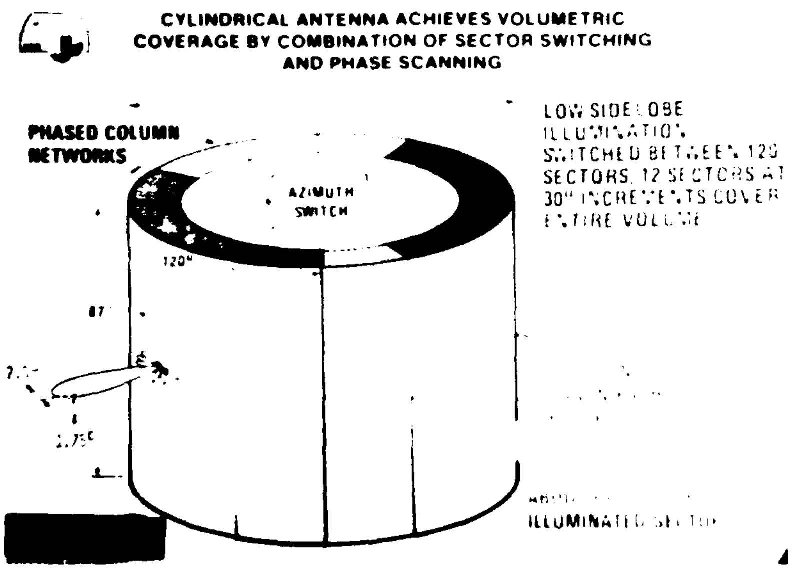
TRANSPORTABILITY: 2 C 130s OR 1 C 141 AIRCRAFT
WORLD WIDE RAIL & ROAD

MOBILITY: 5 MINUTES TO MOVE, 15 MINUTES TO REESTABLISH OPERATION

MAINTAINABILITY RELIABILITY: MTTR 30 MIN, MTBF 500 HOURS
BITE, OPERATOR REPLACEABLE LRUs
NO DEDICATED MAINTENANCE PERSONNEL
HIGH RELIABILITY PARTS
REDUNDANCY

MANNING: 3 AIRMEN



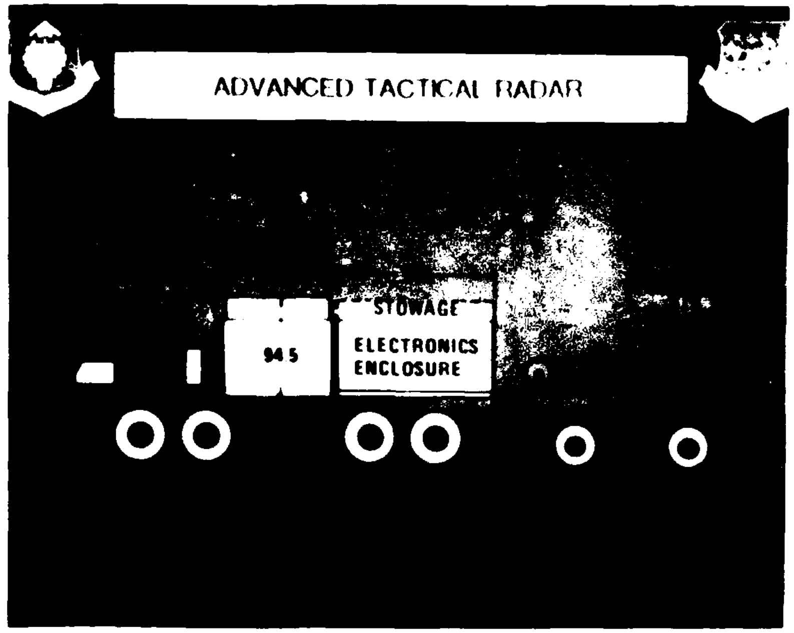


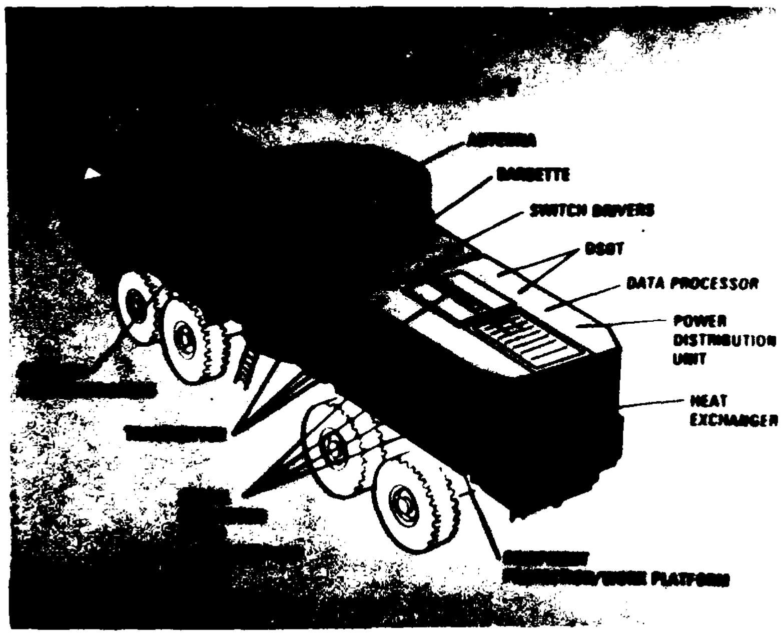
TECHNICAL ATR CHALLENGES

- COMPATIBLE AGILE BEAM, LOW SIDE LOBE, WIDEBAND ANTENNA
- AUTOMATED RADAR COVERAGE CONTROL
- RADAR SIZE, WEIGHT & FUEL CONSUMPTION

AUTOMATIC RADAR COVERAGE CONTROL

- AUTOMATIC ADAPTIVE POWER MANAGEMENT
  5 TO 15 SEC TRACK UPDATE
- AUTOMATIC NORTH ALIGNMENT WITHIN 15 MIN SET UP TIME
- AUTOMATIC HORIZON MAP WITHIN RADAR INITIALIZATION TIME
- AUTOMATIC WAVEFORM SELECTION
  ADAPTIVE TO THE ENVIRONMENT ON A PULSE TO PULSE BASIS





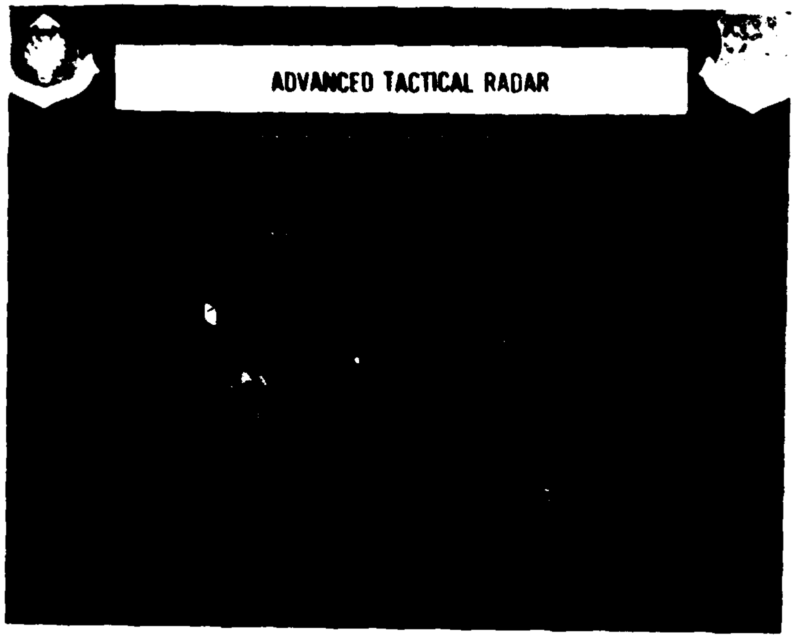
RADAR SIZE, WEIGHT & FUEL CONSUMPTION

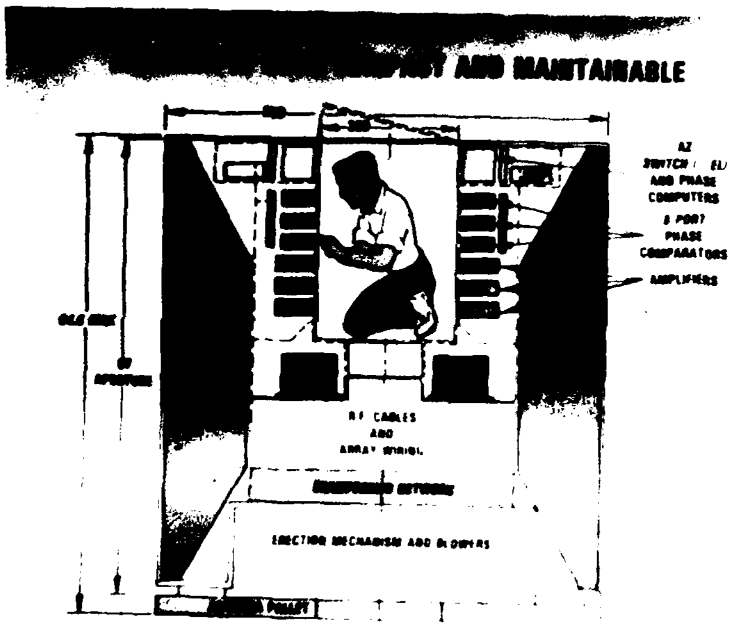
RADAR SIZE WEIGHT & FUEL CONSUMPTION

- LENGTH
  - RADAR ALONE [illegible]
  - RADAR ON TRUCK [illegible]
  - TRUCK & PRIME POWER TOTAL LENGTH [illegible]
- WIDTH [illegible]
- HEIGHT 150 INCHES
- WEIGHT IN LBS

RADAR	32,300
TRUCK	31,000
PRIME POWER	8,500
TOTAL	71,800

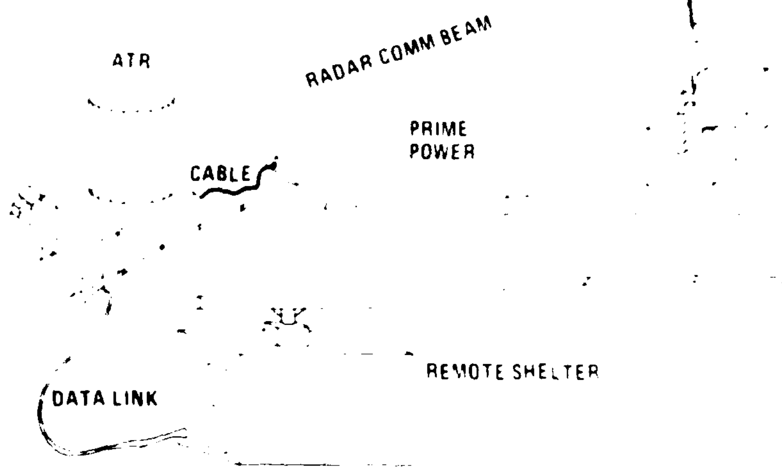
- FUEL CONSUMPTION (150KW) 50 GAL HOUR TOTAL





UNCLASSIFIED

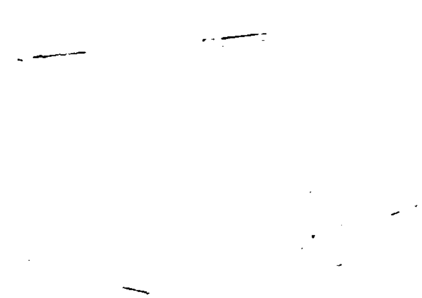
HARDWARE ELEMENTS



UNCLASSIFIED

UNCLASSIFIED

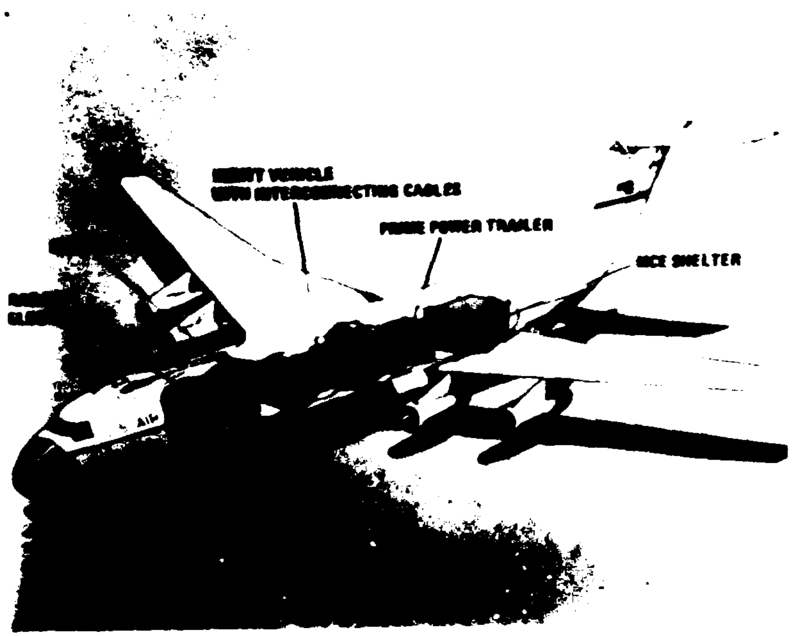
MAINTENANCE PANEL



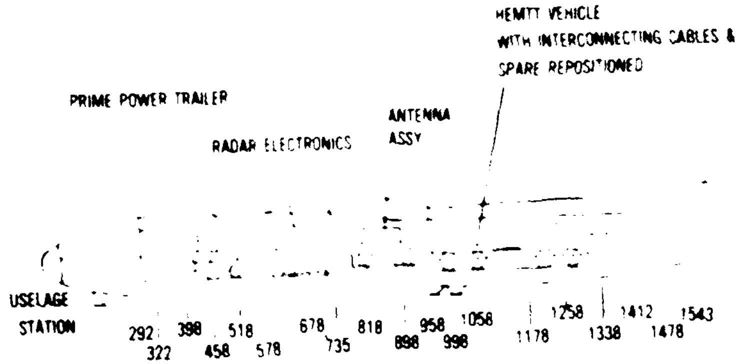
UNCLASSIFIED

TRANSPORTABILITY

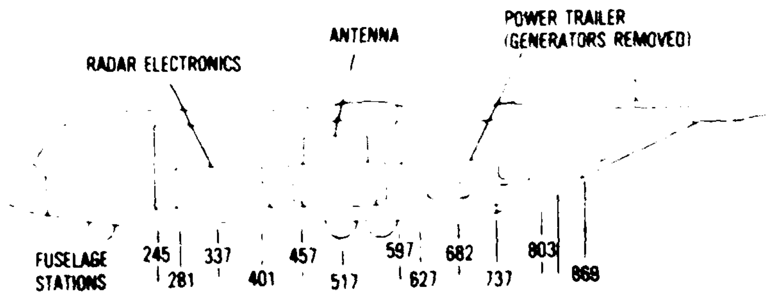
- WORLDWIDE ON C-141B
  FULL 360° COVERAGE FOR 24 HOURS
- INTRATHEATER ON 2 C-130s
- WORLDWIDE RAIL & ROAD



AIRCRAFT LOADING C-141B

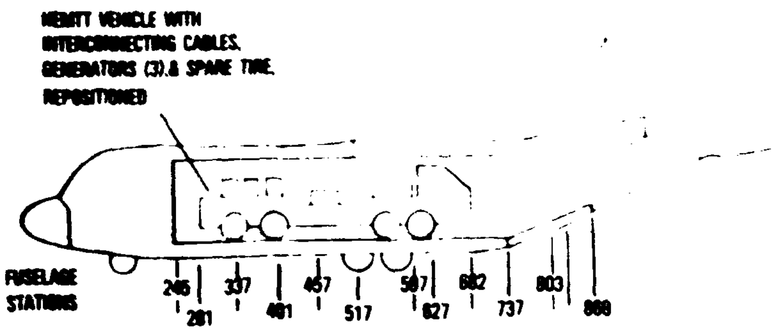


AIRCRAFT LOADING C-130-PLANE 1



CG = STA 484
ALLOWABLE: 457-597

AIRCRAFT LOADING C-130-PLANE 2



CG @ STA 485
ALLOWABLE: 457 -587

MOBILITY

- VEHICLE MOUNTED
- 15 MINUTE DEPLOYMENT TIME
- 5 MINUTE MARCH TIME
- 24 HOUR SELF SUSTAINING

DEPLOYMENT COMPARISON

	[illegible]	[illegible]	ATR-MCE	ATR
PERSONNEL	[illegible]	[illegible]	[illegible]	[illegible]
PRIMARY EQUIPMENT	[illegible]	[illegible]	[illegible]	[illegible]
TRAILER MOBILIZERS	16	16	[illegible]	[illegible]
TRANSPORT AIRCRAFT C-141B	8	8	6	1
TRUCKS	19	16	13	[illegible]
WRSK PALLETS	2	1	0	0

[illegible] DEPLOYMENT CONFIGURATION

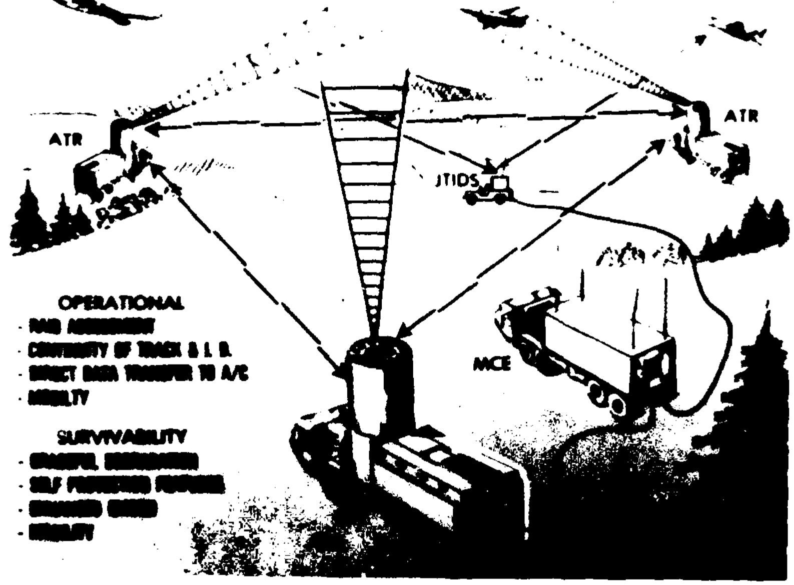
	[illegible]	[illegible]
[illegible]	[illegible] MANUAL [illegible] AND MAINTENANCE	[illegible] AUTOMATIC [illegible] AND MAINTENANCE
[illegible]	[illegible] CAPABILITY	[illegible] CAPABILITY
[illegible]		MCE / ATR
[illegible] MAINTENANCE [illegible] & MANNING	TPS-[illegible] LIMITED AUTOMATION, EXTENSIVE MANUAL MAINTENANCE PROCEDURES; EIGHT (8) RADAR TECHNICIANS ASSIGNED	ATR: FAIL SOFT SUBSYSTEMS AND COMPUTER SOFTWARE CONTROLLED MAINTENANCE DIAGNOSTIC PROCEDURES; THREE (3) RADAR TECHNICIANS ASSIGNED
[illegible] EQUIPMENT	TRC-97 TROPO TSC-53 COMM CONTROL UHF/VHF HF CRYPTO	TROPO INTEGRAL WITH ATR UHF VHF HF CRYPTO INTEGRAL WITH MCE
[illegible] (WRSK)	TWO 463L PALLETS ONE M35 TRUCK	ON BOARD
[illegible]	THIRTY-FIVE MOBILIZERS TRAILERS & TRUCKS	TWENTY-FIVE MOBILIZERS, TRAILERS & TRUCKS
[illegible]	6 HOURS SET-UP 4 HOURS TEAR-DOWN	ATR 15 MIN SET-UP MCE 1 HOUR, SET-UP/TEAR-DOWN
AIRLIFT	EIGHT C-141B'S	SIX C-141B'S

ATR

30 DAY MISSION

PROBABILITY OF HAVING SPARE ON HAND	NO. OF SPARES	NO. OF LRUs	VOLUME [illegible]	WEIGHT [illegible]
98.5	42	34	5.8	348.5
99	98	87	12.3	674.7

ATR INTEROPERABILITY WITH TACS

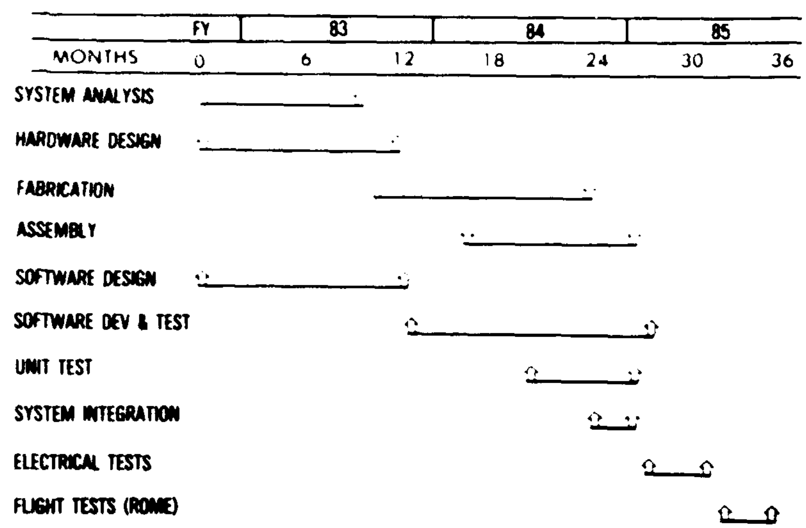


ADVANCED TACTICAL RADAR

TECHNOLOGY INSERTION

- PASSIVE SURVEILLANCE
- MAINLOBE NULLING
- SOLID STATE TX/REC MODULES
- INTEGRATED RADAR/COMM
- ON-BOARD PROCESSING
- MCE/ATR/ATS INTERFACES
- NETTED SURVEILLANCE
- SURVIVABILITY
  - ACTIVE/PASSIVE DECOYS
  - SURVIVABLE TEST BED

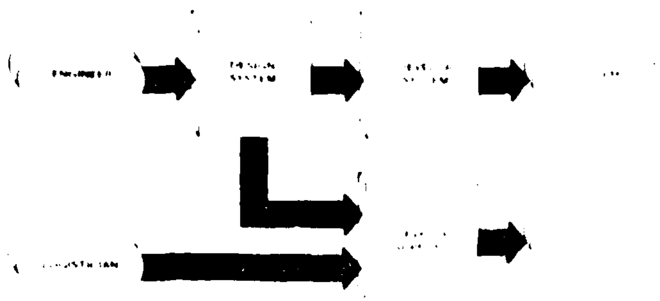
ADVANCED TACTICAL RADAR SCHEDULE



DESIGNING SUPPORT FOR A SYSTEM (REACTIVE MODE)

SYSTEM LIFE CYCLE

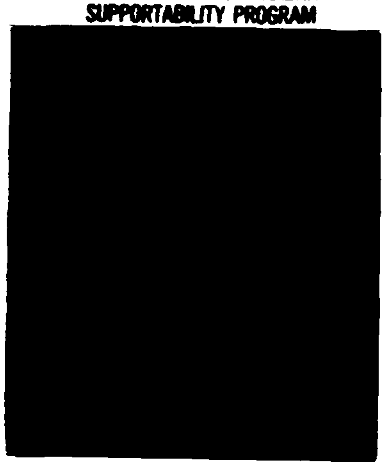
SUPPORT ANALYSIS



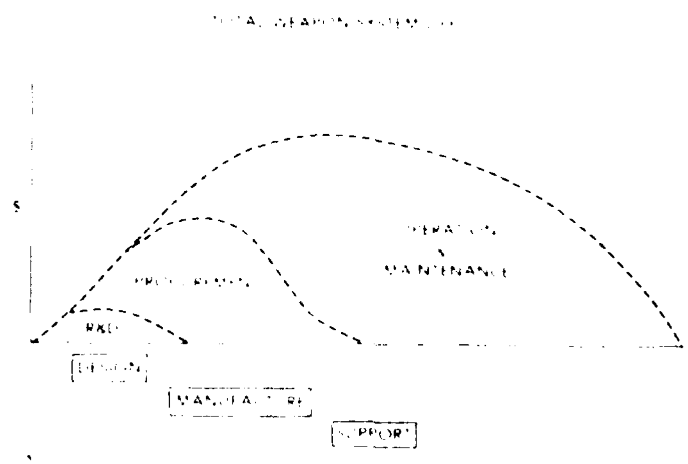
PROGRAM OBJECTIVE

TO INSURE THAT LOGISTICS CONSIDERATIONS INFLUENCE ULTIMATE SYSTEM DESIGN OF ATR EARLY IN ITS DEVELOPMENT

ADVANCED TACTICAL RADAR SUPPORTABILITY PROGRAM



WEAPON SYSTEM COST VS TIME



CONTRACTOR SUPPORT REQUIREMENTS AFTER IOC

- NO CONTRACTOR FIELD SUPPORT REQUIRED
- CONTRACTOR SUPPORT REQUIRED IF SIGNIFICANT ENGINEERING CHANGES ARE MADE (P3I)
  - -- SOLID STATE TECHNOLOGY
  - -- INTEGRATED RADAR/COMMUNICATIONS

HRL TECHNOLOGY WILL BE EXPLORED UNDER TASK 204:

- IDENTIFY TECHNOLOGY THAT CAN BE EXPLOITED TO MINIMIZE SUPPORT MP&T, AND COST
  - -- ENHANCE AND SUSTAIN SYSTEM READINESS
  - -- IDENTIFY RISKS INCLUDING COST AND SCHEDULE IMPACTS

SUPPORTABILITY FEATURES OF THE CURRENT ADM DESIGN

- ON-SITE MAINTENANCE BY 3 MEN (ONE 7-LEVEL, TWO 5-LEVEL)
- BUILT-IN TEST IDENTIFIES FAILED LRU
- LRU REPLACEMENT WITHOUT SPECIAL TOOLS
- ONE-HALF HOUR MTTR
- 163 LRU TYPES, TOTAL OF 10,300 LRUs
- ON-BOARD SPARES WILL COVER 87% OF FAILURES
- BUILT-IN MAINTENANCE AIDS

CANDIDATE SUPPORTABILITY ISSUES TO BE ADDRESSED

- LOCATION AND DUTIES OF ON SITE PERSONNEL DURING SYSTEM OPERATION
- FAULT DETECTION ALARM LOCATION OF DISPLAY
- SYSTEM CONTROL FOR MAINTENANCE
- ACCESSIBILITY FOR SERVICING
- OPTIMUM SPARES LOAD TO BE CARRIED ON THE VEHICLE
- REPAIR CONCEPT PROCEDURES FOR NON LRU FAULTS
- AIRCRAFT ONLOADING AND OFFLOADING
- ELIMINATION OF PAPER TECH ORDERS

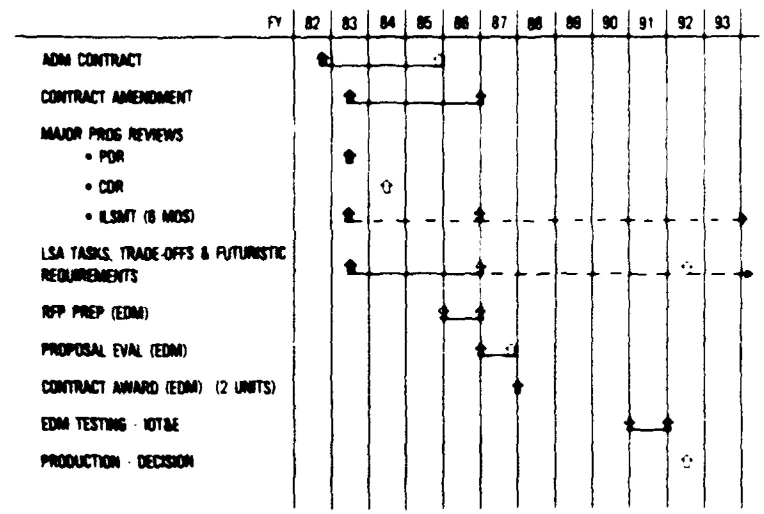
ATR LSA PROGRAM STATUS:

- LSA CONTRACT AMENDMENT ISSUED - 5 AUG 83
- ILSMT "KICKOFF" MEETING - 17 & 18 AUG 83
  - -- IDENTIFIED BASELINE COMPARISON SYSTEM (BCS) CANDIDATES (ARMY NAVY MARINES AIR FORCE)
- ILSMT SITE SURVEYS TO VERIFY DATA
  - -- 12 - 14 SEP - SACRAMENTO
  - 15 - 16 SEP - LUKE AFB
  - 24 - 28 OCT - EGLIN AFB, HURLBURT AFB & DOTHAN, AL
- LSA NEGOTIATED PRICE - 13 OCT 83
  - -- $1,221,890
- CONTRACTOR'S SUPPORTABILITY ANALYSIS PLAN (CDRL B004)
  - -- RECEIVED 12 OCT 83

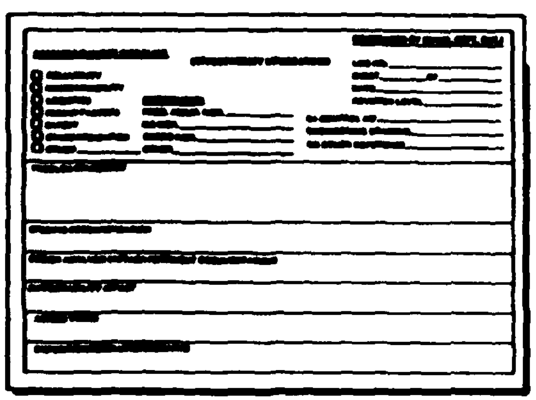
LSA RESULTS:

- WILL BE INCORPORATED INTO FULL SCALE ENGINEERING DEVELOPMENT (FSED) SPECIFICATION
- PROVIDES BASELINE TO DRIVE "DESIGNED-IN SUPPORTABILITY" EFFORT
- LSA PROCESS WILL BE CONTINUED THROUGHOUT FOLLOW-ON PHASES
- EMPHASIZES DEMONSTRATION VICE ANALYSIS DURING ADM TESTING
- FORCED REALIGNMENT OF CONTRACTOR'S ORGANIZATIONAL STRUCTURE

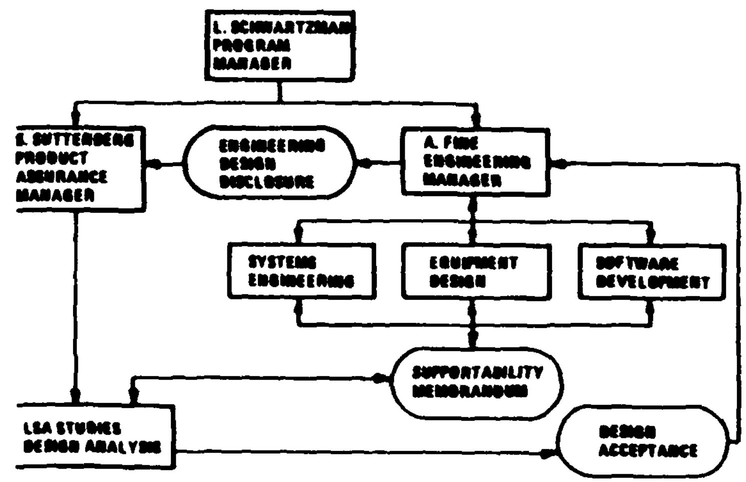
SCHEDULE



SUPPORTABILITY MEMORANDUM



LSA/ENGINEERING DESIGN REVIEW PROCESS



ADVANCED TACTICAL RADAR (ATR) PROGRAM

SUPPORTABILITY EFFORTS

** LOGISTIC SUPPORTABILITY ANALYSIS (LSA) QUESTIONS

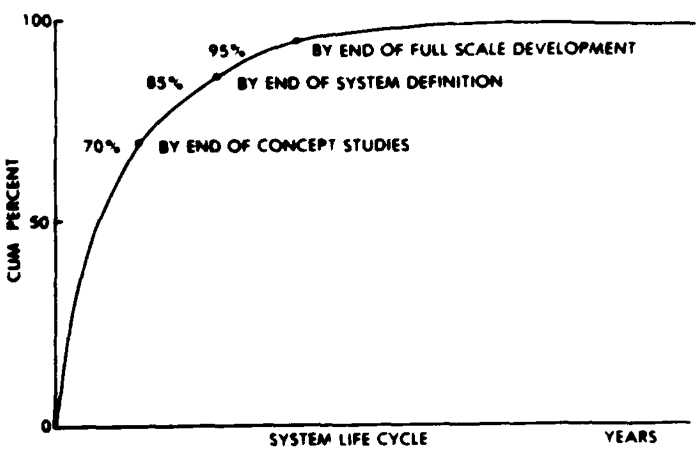
- WHAT ARE THE LSA TASKS FOR ATR?
  - TASK 102: SUPPORT ANALYSIS PLAN
  - TASK 103: PROGRAM AND DESIGN REVIEWS
  - TASK 201: USE STUDY
  - TASK 202: MISSION HARDWARE, SOFTWARE, AND SUPPORT SYSTEM STANDARDIZATION
  - TASK 203: COMPARATIVE ANALYSIS
  - TASK 204: TECHNOLOGICAL OPPORTUNITIES
  - TASK 205: SUPPORTABILITY AND SUPPORTABILITY RELATED DESIGN OBJECTIVES, GOALS, THRESHOLDS, CONSTRAINTS, AND RISKS
  - TASK 301: FUNCTIONAL REQUIREMENTS IDENTIFICATION
  - TASK 302: SUPPORT SYSTEM ALTERNATIVES
  - TASK 303: EVALUATION OF ALTERNATIVES, AND TRADE-OFF ANALYSIS
  - TASK 501: SUPPORTABILITY TEST, EVALUATION, AND VERIFICATION
  - LIFE CYCLE COST/DESIGN TO COST (LCC/DTC)

INTEGRATED LOGISTIC SUPPORT MANAGEMENT TEAM (ILSMT)

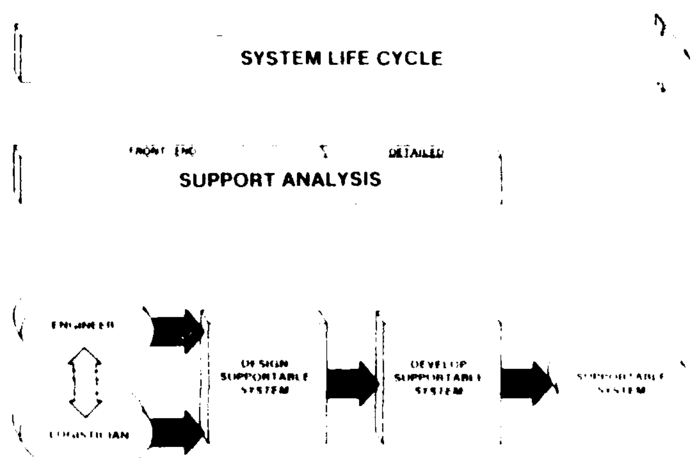
MEMBERSHIP

RADC ATR PROGRAM OFFICE (OCD)
  CO CHAIRMAN
RADC INTEGRATED LOGISTIC SUPPORT OFFICE (LW)
  CO CHAIRMAN
RADC RELIABILITY/MAINTAINABILITY (RB)
AIR FORCE ACQUISITION LOGISTICS CENTER (PTE PTA PTR)
  ADV CONCEPTS SUPPORTABILITY TEAM (ACST)
SACRAMENTO ALC (MMA MMC)
HEADQUARTERS TACTICAL AIR COMMAND (LGK)
CONTRACTOR (SPERRY ELECTRONIC SYSTEMS)
AD HOC ADVISORS (AS NECESSARY)
-- AFHRL (AUTO TECH DATA FORMAT)
-- ATTLA (MOBILITY AND AIR TRANSPORTABILITY)
-- ATC (TECHNICAL TRAINING IMPACTS)

SCHEDULE OF DECISIONS AFFECTING LCC



DESIGNING A SUPPORTABLE SYSTEM
(INTERACTIVE MODE)



LSA DOCUMENTATION/ANALYSIS

ENGINEERING DECISIONS:

- DESIGN TRADEOFFS VS LCC COSTS
  - SIGNAL BANDWIDTH; JAMMER POWER/ANT SIDELOBES; TRANSMIT PWR
- RELIABILITY VS COST OF REPAIR/THROW AWAY PHASE SHIFTERS; ARRAY COLUMNS
- BUILT-IN FAULT ISOL TO SUPPORT MAINT CONCEPT
  - SING LRU; ISOLATE FAILED PHASE SHIFTERS, CIRCUIT CARDS
- SPARES IDENTIFICATION
  - FIELD (WRSK), DEPOT, ISSL
- DEVELOP PMI TO PREVENT/MINIMIZE DOWNTIME
  - IDENT CRITICAL COMPONENTS; PHASE SHIFTER REPLACEMENT
- FAILURE MODE ANALYSIS TO IMPROVE RELIABILITY
  - AUTOMATIC CIRCUIT RECONFIGURATION/CIRCUMVENTION
- RELIABILITY
  - BUILT-IN PERFORMANCE MARGINS, REDUNDANT CIRCUITS
- IDENTIFY HIGH FAILURE ITEMS

ABOUT MODERNIZATION IN THE ARMY

A

PRESENTATION BY

COL FRANCIS GNIAZDOWSKI

CHIEF, ILS AND MODERNIZATION DIVISION

OFFICE OF THE DEPUTY CHIEF OF STAFF FOR LOGISTICS

DEPARTMENT OF THE ARMY

FOR THE

AMERICAN DEFENSE PREPAREDNESS ASSOCIATION

ILS SYMPOSIUM II

2 DECEMBER 1983

HYATT REGENCY HOTEL

FORT WORTH, TEXAS

PART I (NARRATIVE)

LOGO ON PRIOR TO PRESENTATION

GOOD MORNING LADIES & GENTLEMEN.

I APPRECIATE THE OPPORTUNITY TO BE HERE TODAY AND TO SHARE WITH YOU SOME CURRENT INFORMATION ABOUT MODERNIZATION IN THE ARMY.

SLIDE 1 ON

o MY OPENING CHART IS FROM A RECENT COVER TO THE ARMY LOGISTICIAN.. THE LOGISTICIANS....THE MAGAZINE WE USE TO KEEP THE LOGISTICS COMMUNITY UP TO DATE.

o THE PICTURE IS SYMOBLIC OF WHAT I WANT TO TALK ABOUT TODAY. THAT IS, OUR TRANSITION TO MODERNIZATION AND THE CHALLENGES IT REPRESENTS, NOT ONLY FOR THE LOGISTICIAN...BUT ALSO FOR THE TOTAL ARMY, AND FOR THE INDUSTRIAL COMMUNITY.

SLIDE 1 OFF

SLIDE 2 ON

THE REAL PROBLEMS WE FACE IN THE ARMY ARE NOT MODERNIZATION PROBLEMS. LORD KNOWS, WE NEED TO MODERNIZE OUR WEAPON AND SUPPORT SYSTEMS TO PRODUCE "A TOTAL ARMY EQUIPPED AND SUSTAINED TO WIN ANY LAND BATTLE."

THAT IS OUR "MATERIEL GOAL," ONE OF THE SEVEN ARMY GOALS ESTABLISHED BY OUR CHIEF OF STAFF. AS THIS CHART INDICATES, THE REAL PROBLEM IS IN FORCE INTEGRATION AND WITHOUT THE LOSS OF READINESS.

SLIDE 2 OFF

HERE'S WHAT WE MEAN BY TOTAL SYSTEM FIELDING (PAUSE)

SLIDE 3 ON

TALKING IN TERMS OF "LOGISTIC NEEDS," OUR NEEDS ARE FOR NEW IDEAS, NEW APPROACHES, AND NEW MATERIEL WHICH WILL ENABLE US TO HAVE THE RIGHT SUPPLIES AND EQUIPMENT IN THE RIGHT PLACE, IN THE RIGHT QUANTITIES, AT THE RIGHT TIME. WE MUST BE ABLE TO DO THIS ROUTINELY AS A PART OF OUR TOTAL SYSTEMS FIELDING EFFORT.

NOTE THAT OUR THEN VCSA AND NOW OUR CSA HAS EMPHASIZED THE ORGANIZATIONAL APPROACH. BELIEVE ME, THIS THRUST IS A PART OF OUR DAILY MODERNIZATION EFFORT. I THINK IT IS IMPORTANT TO MENTION THAT OUR VCSA IS ACTIVELY INVOLVED IN ALL PHASES OF FORCE MODERNIZATION. HE IS CURRENTLY REVIEWING ALL REQUESTS FOR CONDITIONAL RELEASES OF EQUIPMENT AND FULLY INTENDS NOT TO FIELD ANY SYSTEM THAT IS NOT TOTALLY SUPPORTABLE.

SLIDE 3 OFF

SLIDE 4 ON

THIS MODEL PORTRAYS THE EIGHT (8) FUNCTIONAL AREAS AND THEIR INTERRELATIONSHIPS. NOT TO BE CONFUSED WITH 17 OPERATIONAL FUNCTIONAL AREAS I WILL MENTION LATER. IT DEMONSTRATES THE WAY THAT THE SYSTEMS AND PROCESS OF THE ARMY MUST FUNCTION VERTICALLY, HORIZONTALLY, AND ITERATIVELY. THIS CHART TOUCHES ON MANY ONGOING INITIATIVES IN THE ARMY TODAY.

FORCE DEVELOPMENT IS THE FOUNDATION UNDERLYING ALL OTHER FUNCTIONAL AREAS. IT PROVIDES THE DETERMINATION OF THE ARMY'S REQUIREMENTS AND AUTHORIZATIONS FOR PEOPLE AND MATERIEL. FROM A FORCE MODERNIZATION PERSPECTIVE, CONCERN FOR THE ACQUISITION FUNCTION EXTENDS BEYOND THE SPECIFIC MATERIEL ITEM BEING FIELDED TO OTHER COMPLEMENTARY AREAS SUCH AS THE AVAILABILITY OF ASSOCIATED SUPPORT ITEMS OF EQUIPMENT (ASIOE), PUBLICATIONS, PRESCRIBED LOAD LIST ITEMS, TRAINED PERSONNEL, AND APPROPRIATE FACILITIES.

THE TRAINING FUNCTION IS THE VEHICLE FOR ACCOMPLISHING AN ORDERLY TRANSITION FROM CIVILIAN STATUS TO MILITARY LIFE.

HAVING PRODUCED SOLDIERS AND PROVIDED THEM WITH BASIC SKILLS AND KNOWLEDGE, WE MUST THEN DISTRIBUTE THESE PEOPLE AND THE ACQUIRED MATERIEL ACCORDING TO THE PRIORITIES AND CONSTRAINTS ESTABLISHED BY THE ARMY.

AFTER DETERMINING THE DISTRIBUTION OF PEOPLE AND THINGS, WE THEN MUST DEPLOY UNITS, PEOPLE, AND THINGS NOT ONLY IN CONUS BUT OVERSEAS IN ACCORDANCE WITH THE WORLDWIDE COMMITMENTS OF THE ARMY. THIS INVOLVES NOT ONLY AGENCIES ON THE ARMY STAFF OR AT OTHER LEVELS OF DOD BUT ALSO CIVILIAN TRANSPORTATION ORGANIZATIONS AS WELL.

IN PEACE OR WAR THE ARRIVAL OF PEOPLE AND MATERIEL IN UNITS, AT A PREDETERMINED DESTINATION, ESTABLISHES A REQUIREMENT TO SUSTAIN THEM.

THE TEN CLASSES OF SUPPLY, THE AUTHORIZED STOCKAGE LIST (ASL), OR PRESCRIBED LOAD LIST (PLL ARE SOME EXAMPLES OF SYSTEMS OR TECHNIQUES USED TO SUSTAIN PEOPLE AND MATERIEL. MAINTENANCE IS ALSO A SUSTAINMENT PROCESS FOR MATERIEL.

IN ESSENCE, THE ARMY SUSTAINS ITSELF THROUGH THE ACQUISITION AND USE OF RESOURCES TO INCLUDE PEOPLE, THINGS, MONEY, TIME, INFORMATION, AND VERY IMPORTANTLY TECHNOLOGY. WHILE THE ARMY IS SUSTAINING ITSELF, IT IS ALSO CONSTANTLY DEVELOPING ITSELF.

UNITS ARE DEVELOPED THROUGH COLLECTIVE TRAINING USING DEVICES SUCH AS ARMY TRAINING EVALUATION PROGRAM, EMERGENCY DEPLOYMENT READINESS EXERCISES, AND OPERATIONAL READINESS TESTS.

FINALLY, THERE COMES A TIME WHEN THE ARMY DOES NOT HAVE A NEED FOR SPECIFIC PEOPLE OR EQUIPMENT, AND THEY ARE SEPARATED FROM MILITARY CONTROL. THE ARMY NORMALLY SEPARATES MATERIEL BY THE PROPERTY DISPOSAL OFFICE (PDO) PROCESS OR THROUGH FOREIGN MILITARY SALES ACTIONS. IN THE CASE OF OLDER EQUIPMENT BEING DISPLACED BY MODERNIZED EQUIPMENT, THE COMMANDER LOSING THE OLDER MODEL MAY VIEW IT AS A "SEPARATION" ACTION WHILE THE COMMANDER RECEIVING THE DISPLACED ITEM WILL VIEW IT AS AN "ACQUISTION" FUNCTION. IN FACT, DISPLACING EQUIPMENT IN FORCE MODERNIZATION NOT RESULTING IN A PDO OR FMS ACTION IS, IN REALITY, A (RE) "DISTRIBUTION" FUNCTION. IN TERMS OF ILS, WE MUST TREAT DISPLACED EQUIPMENT IDENTICALLY TO NEW EQUIPMENT WHEN IT IS BEING FIELDED TO A UNIT FOR THE FIRST TIME. WE ADDRESSED

THIS IN OUR RECENTLY PUBLISHED ILS REGULATION AR 700-127. ALL OF THESE FUNCTIONS, WHILE STANDING ALONE, DO NOT REPRESENT A SYSTEM. HOWEVER, WHEN WE APPLY FEEDBACK LOOPS BETWEEN ANY AND ALL OF THESE FUNCTIONS AND PROVIDE THE NECESSARY RESOURCES TO ENABLE LEADERSHIP, COMMAND, AND MANAGEMENT TO DO ITS JOB, WE THEN HAVE A FUNCTIONING ARMY AT ANY LEVEL OF ORGANIZATION. WHEN THE FUNCTIONAL LIFE CYCLE MODEL IS APPLIED TO FORCE MODERNIZATION, THE FOCUS CENTERS ON A TOTAL SYSTEMS FIELDING CONCEPT. THE TOTAL SYSTEMS FIELDING CONCEPT ENVISIONS THAT NEW AND REDISTRIBUTED EQUIPMENT IS FIELDED SIMULTANEOUSLY WITH RELATED PUBLICATIONS, ASIOE, FACILITIES AND ORGANIZATIONAL AND MANNING SUPPORT. ALL OF THESE FUNCTIONS AND AREAS ARE BEING CLOSELY SCRUTINIZED THROUGH OUR VCSA DIRECTED AND CHAIRED FUNCTIONAL AREA ASSESSMENTS WHICH ARE ONGOING BY FUNCTIONAL AREA IN THE ARMY. THIS IS A MAJOR EFFORT BY OUR LEADERS TO FIELD ONLY THOSE SYSTEMS, UNITS, AND EQUIPMENT, WHICH IS READY FOR COMBAT.

SLIDE 5 ON

KEEPING IN MIND THAT FORCE MODERNIZATION INCLUDES FORCE DEVELOPMENT, ORGANIZATIONAL MODERNIZATION AND EQUIPMENT MODERNIZATION, THIS SLIDE PORTRAYS SOME OF THE MAJOR CONCERNS OF THE LOGISTICS COMMUNITY.

AD A151 676 PROCEEDINGS OF THE INTEGRATED LOGISTICS SUPPORT SYMPOSIUM HELD AT FORT WO..(U) AMERICAN DEFENSE PREPAREDNESS ASSOCIATION ARLINGTON VA 02 DEC 83

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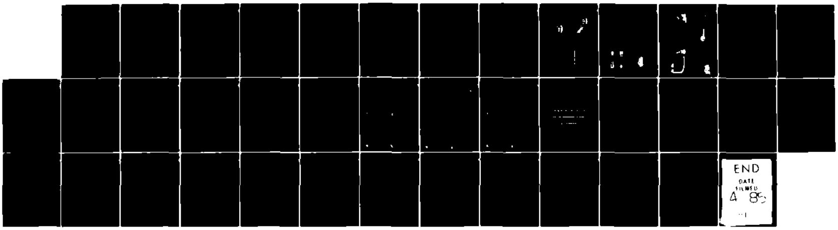

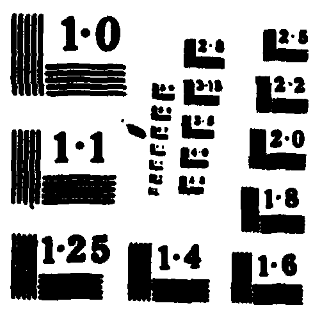
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THE BOW WAVE OF MODERNIZATION IS HERE AND WILL BE WITH US FOR A FEW YEARS. TO PRECLUDE FAILURE WILL REQUIRE NOT A LOGISTICS, BUT A TOTAL TEAM EFFORT.

SLIDE 5 OFF

SLIDE 6 ON

AS GENERAL THOMPSON MENTIONED THE OTHER DAY AT THE LUNCHEON PRESENTATION, THE ARMY'S RATE AND SCOPE OF MODERNIZATION IS GREATEST SINCE WORLD WAR II. THIS CHART COVERS A FEW SELECTED ITEMS FROM A DARCOM MAJOR SUBORDINATE COMMAND. NOTE THAT WE ARE TALKING ABOUT FIELDING MORE THAN 85,000 COMBAT AND TACTICAL VEHICLES AND ENGINEER EQUIPMENT DURING FY84 AND FY85.

SLIDE 6 OFF

SLIDE 7 ON

LET'S LOOK AT IT ANOTHER WAY. DURING THE LAST NINE (9) MONTHS OF FY84, THESE 4 UNITS ARE SCHEDULED TO HAVE THE RECEIPT AND DISPLACEMENT ACTIVITY AS SHOWN. NOW, IF WE INCLUDE ALL OF THE LESSER ITEMS AND SIMULTANEOUSLY TALK ABOUT ALL OF THE UNITS IN THE ARMY, YOU CAN BEGIN TO SEE THE CHALLENGE THAT WE FACE.

SLIDE 7 OFF

SLIDE 8 ON

AS MENTIONED IN OUR TOTAL SYSTEM APPROACH, THE TIMING AND COORDINATION FOR DELIVERY OF ALL COMPONENTS OF EACH WEAPON AND VEHICLE SYSTEM IS COMPLICATED.

o THE TOOLS, REPAIR PARTS, AND TECHNICAL MANUALS MUST ALSO GET THERE ON TIME.

o THE OLD SYSTEMS MUST WORK AND BE COMPATIBLE WITH THE NEW,

o READINESS CAN'T BE JEOPARDIZED, AND

o THE TRANSITION MUST BE ORDERLY, TO PERMIT THE BEST POSSIBLE SUPPORT AT EVERY MODERNIATION STEP.

SLIDE 8 OFF

SLIDE 9 ON

THESE ARE THE FOUR COMPONENTS TO OUR LOGISTICS CHALLENGE

o THE MAJOR LIMITER COULD VERY WELL BE THE RESOURCES TO DO THE JOB

oo THE DISTRIBUTION/REDISTRIBUTION .....CHALLENGE IS ENORMOUS

oo A MODERN FORCE MUST BE LINKED TO A MODERN MAINTENANCE STRUCTURE

oo RC TRANS MOD IS OUR NEW CONCEPT TO PROVIDE INTENSIVE MANAGEMENT AND VISIBILITY OF RESERVE COMPONENT TRANSITION TO MODERNIZATION

oo LOGISTICS COMMAND AND CONTROL IS VITAL TO OUR SUCCESS....WE MUST HAVE MANAGEMENT SYSTEMS AND COMMUNICATION NETWORKS IN PLACE TO PROPERLY EXECUTE OUR MISSION.

SLIDE 9 OFF

SLIDE 10 ON

THE BOTTOM LINE IN THE DISTRIBUTION/REDISTRIBUTION CHALLENGE IS OUR DISTRIBUTION OBJECTIVE OF THE MATERIEL GOAL, "TO ENSURE THAT THE RIGHT MATERIEL IS DISTRIBUTED TO THE RIGHT PLACE, ON TIME, AND IN THE QUANTITY REQUIRED." AGAIN, WE MUST CONSIDER READINESS IN EVERYTHING WE DO AND ALSO MUST BE AWARE OF THE COSTS INHERENT IN FIELDING IF IT ISN'T DONE IN A DISCIPLINED INTEGRATED MANNER.

SLIDE 10 OFF

SLIDE 11 ON

WHAT'S BEING DONE?

(TAEDP STANDS FOR "TOTAL ARMY EQUIPMENT DISTRIBUTION PROGRAM".)

o WE ARE IMPROVING OUR DISTRIBUTION SYSTEMS AND MODELS.

o WE ARE REVISING OUR EQUIPMENT TRANSFER STANDARDS.

o WE ARE REVIEWING OUR DISPLACED EQUIPMENT POLICY, AND

WE ARE BEGINNING TO TAKE A TOTAL SYSTEMS APPROACH TO EQUIPMENT FIELDING

SLIDE 11 OFF

SLIDE 12 ON

THE MAINTENANCE CHALLENGE.

o NEW EQUIPMENT DICTATES COMPLEMENTARY CHANGES IN MAINTENANCE TECHNIQUES AND WORK FORCE.

o COSTS OF PRINTED CIRCUIT BOARDS AND SOPHISTICATED REPAIR REQUIREMENTS PRESENTS A NEW KIND OF SPARES PROBLEM.

o WE HAVE CHANGED FROM MECHANICAL TO HIGH TECH, AND KNOWLEDGE OF TMDE, ITS USE, AND IMPORTANCE OF CALIBRATION ARE ESSENTIAL.

SEVERAL BRIEFERS HAVE TALKED ABOUT TMDE. SOME OF OUR IMMEDIATE TMDE CHALLENGES ARE:

oo TO MAXIMIZE THE USE OF BUILT IN TEST EQUIPMENT (BITE)

oo DESIGN EQUIPMENT FOR TESTABILITY

oo USE COMMERCIAL STATE OF THE ART AUTOMATIC TEST EQUIPMENT

oo STANDARDIZATION OF ATE SOFTWARE

SLIDE 12 OFF

SLIDE 13 ON

WHAT'S BEING DONE?

THE ARMY WORLDWIDE MAINTENANCE CONFERENCE HELD IN MARCH WAS A GATHERING OF THE ARMY MAINTENANCE COMMUNITY TO GAUGE THE IMPACT OF MODERNIZATION AND TO PLAN MAINTENANCE FOR THE FUTURE. THIS

CONFERENCE RESULTED IN 327 RECOMMENDED ACTIONS AND 43 CHALLENGES FOR THE ARSTAF. FOLLOW ON ACTIONS FROM THIS CONFERENCE ARE BEING PURSUED AND ARE PRODUCING EXCELLENT RESULTS.

SLIDE 13 OFF

SLIDE 14 ON

LOOKING AT THE RC TRANS MOD CHALLENGE.

THERE ARE THREE THINGS I WOULD LIKE YOU TO APPRECIATE FROM THIS CHART.

FIRSTLY, 70 PLUS % OF OUR COMBAT SERVICE SUPPORT DURING WARTIME COMES FROM THE RESERVE COMPONENTS.

SECONDLY, THE ARMY RESERVE COMPONENTS ARE BEING MODERNIZED ON THE SAME BASIS AS OUR ACTIVE FORCES.

THIRDLY, THE RESERVE COMPONENTS HAVE AT MAX 38 DAYS OF ANNUAL TRAINING, MOSTLY A DAY OR TWO AT A TIME. AS MENTIONED ON A FEW OCCASIONS OVER THE PAST COUPLE OF DAYS, YOU MUST KNOW YOUR USERS, AND A SIZEABLE % OF THESE USERS ARE NOT IN UNIFORM EVERYDAY

SLIDE 14 OFF

SLIDE 15 ON

WHAT'S BEING DONE?

o FORSCOM IS ALIGNING RC SUPPORT UNITS WITH COMBAT UNITS BASED ON

CAPSTONE...ALIGNIMENT OF UNITS FOR TEN OF THE MAJOR PACING ITEMS IN THE FMMP IS COMPLETE.

o IDENTIFICATION OF SPECIAL TOOL AND TEST EQUIPMENT FOR MAINTENANCE UNITS HAS BEEN QUANTIFIED, AND INITIAL FUNDING HAS BEEN PROVIDED IN THE FY85-89 POM TO FORSCOM.

o ONCE ALIGNMENT IS COMPLETE, TRAINING PLANS WILL BE TAILORED TO SYNCHRONIZE TRAINING ON MODERNIZED EQUIPMENT WITH SUPPORTED UNIT MODERNIZATION.

o BASED ON A FORSCOM REQUEST, DARCOM AND DLA, ARE TAKING ACTION TO LOCATE ADDITIONAL STORAGE SPACE FOR RC UNITS...INITIAL RESULTS LOOK GOOD.

o SELECTED (D+60) RC UNITS ARE SCHEDULED TO RECEIVE COMBAT ASL/PLL. INITIAL FUNDING HAS BEEN PROVIDED.

SLIDE 15 OFF

SLIDE 16 ON

COMMAND & CONTROL

o AS POINTED OUT EARLIER, MASSIVE SHIFTS OF EQUIPMENT ARE AS DEMANDING AS WARTIME LOGISTICS REQUIREMENTS

o WE MUST RECOGNIZE THE COSTS WHICH WILL ACCRUE IN FIELDING IF IT ISN'T DONE IN AN INTEGRATED, DISCIPLINED MANNER.

o WE MUST ALSO BE SENSITIVE THAT END RESULT COULD BE CUTS IN ONGOING PROGRAMS ARMYWIDE

o WE BADLY NEED A STATE-OF-THE-ART AUTOMATED CSS MANAGEMENT SYSTEM - WITH COMMUNICATION CAPABILITY. AN ATTEMPT TO SATISFY THIS NEED IS UNDER-WAY ON THE ARMY STAFF THRU ESTABLISHMENT OF THE ARMY EQUIPMENT FIELDING OFFICE (BATTLE STAFF).

SLIDE 16 OFF

SLIDE 17 ON

SUMMARY

o IN SUMMARY, WE ARE WORKING HARD TO MAKE MODERNIZATION A SUCCESS.

o THE COLLECTIVE LOGISTICS COMMUNITY HAS BEEN MOBILIZED TO TAKE POSITIVE ACTION TO SOLVE THE LOGISTIC CHALLENGES.

o WE CANNOT SOLVE THESE CHALLENGES WITHOUT THE FULL SUPPORT OF INDUSTRY.

o REMEMBER, THE BOTTOM LINE IS THAT YOU MUST KNOW AND UNDERSTAND YOUR USER. THE USER HERE IS NOT ONLY THE SOLDIER IN THE FIELD, BUT ALSO, THE CITIZEN SOLDIER IN THE RESERVE COMPONENTS.

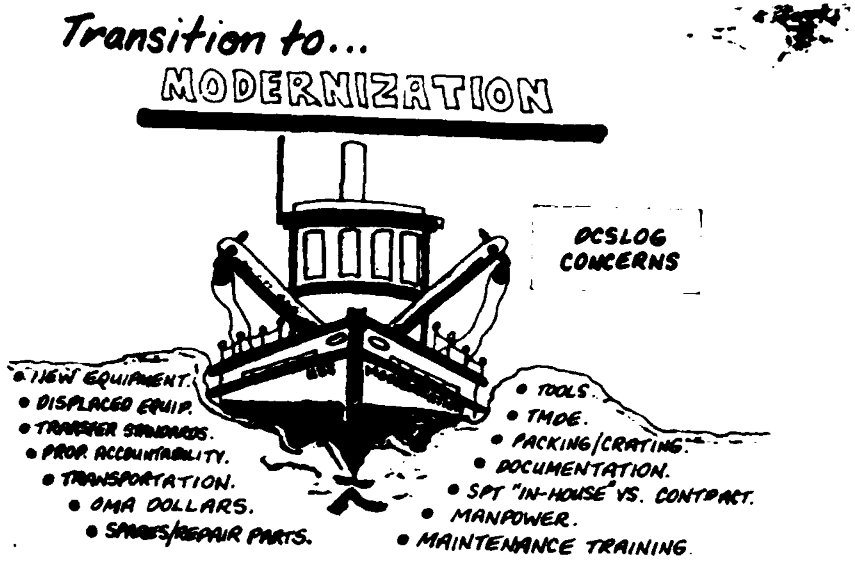
o SECONDLY, OUR CHIEF OF STAFF, AND VCSA HAVE CLEARLY DIRECTED THAT WE WILL NOT FIELD SYSTEMS THAT ARE NOT SUPPORTABLE, AND WE <u>CANNOT</u> AFFORD TO DEGRADE OUR READINESS DURING ANY PHASE OF OUR MODERNIZATION PROCESS.

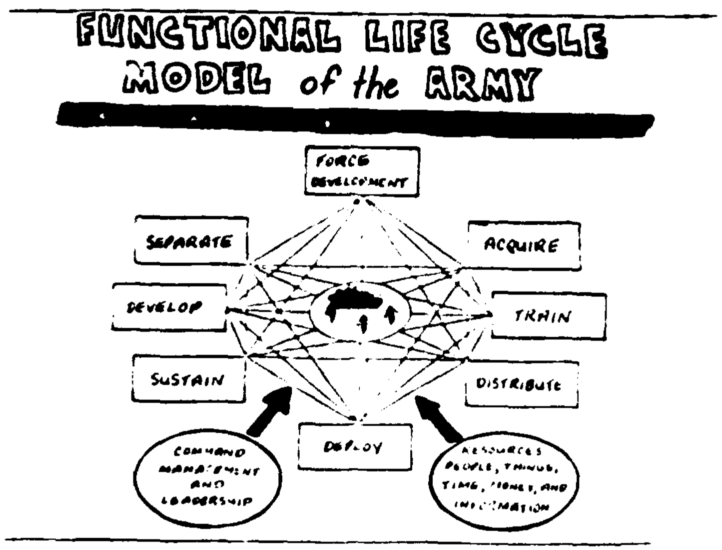
PROBLEM NOT FORCE MODERNIZATION BUT

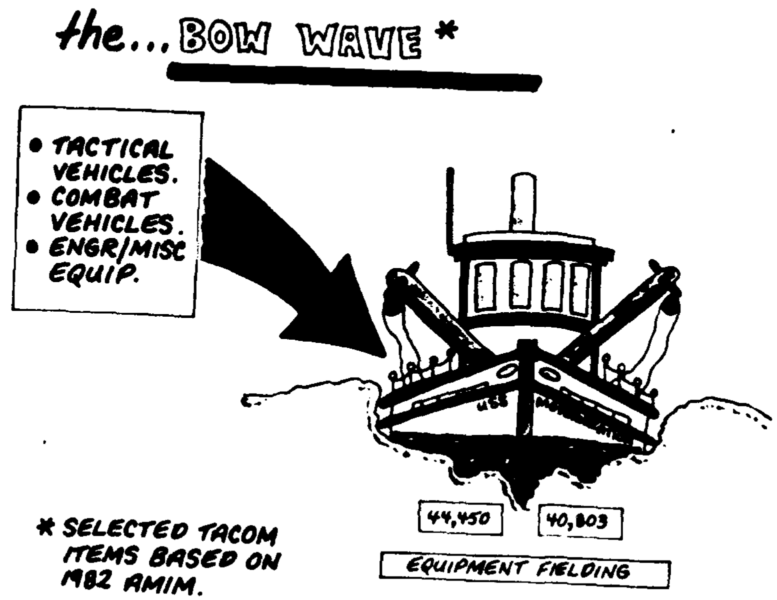
FORCE INTEGRATION

WITH OBJECTIVE OF

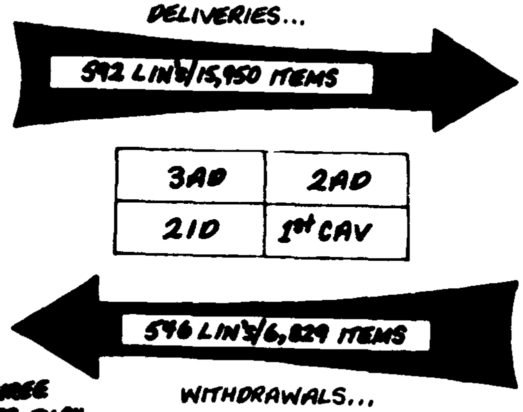
TOTAL SYSTEMS FIELDING







4 DIVISION SUMMARY *



* LAST THREE QUARTERS FY 84-SELECTED ITEMS.

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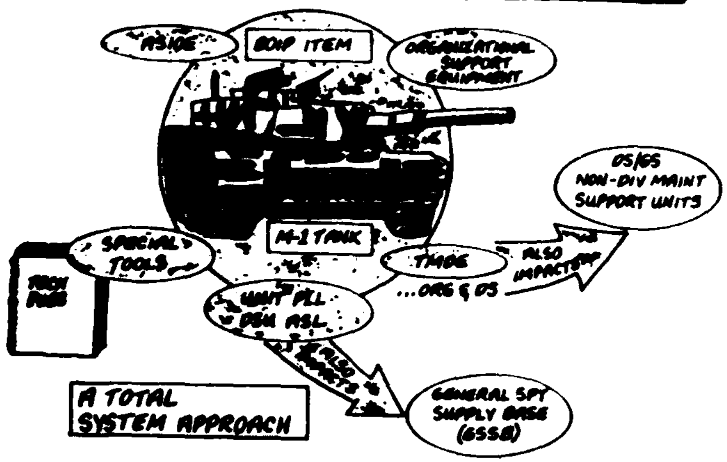
the... LOGISTICS CHALLENGE

- DISTRIBUTION/REDISTRIBUTION.
- MAINTENANCE.
- RC TRANSITION TO MODERNIZATION.
- COMMAND AND CONTROL.

TOTAL PACKAGE/UNIT MATERIEL FIELDING



A TOTAL SYSTEM APPROACH

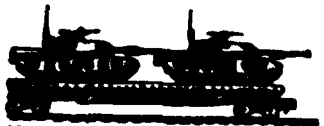
DISTRIBUTION/REDISTRIBUTION CHALLENGE

TO... ANTICIPATE and SOLVE

- FIELDING BOTTLENECKS.
- CONTRACTOR DELIVERY PROBLEMS.
- REDISTRIBUTION OF DISPLACED EQUIPMENT.
- PRIORITIZATION CONFLICTS...DIVERSION OF FUNDS.

MUST BALANCE FIELDING OF NEW EQUIPMENT WITH NEAR-TERM READINESS.

DISTRIBUTION/REDISTRIBUTION CHALLENGE



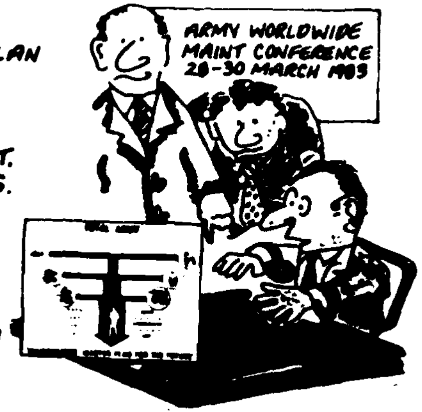
WHAT'S BEING DONE

- TAEDP IMPROVEMENTS AND MODERNIZATION ACTIONS.
- FORSCOM REVIEWING EQUIP TRANSFER STANDARDS.
- HQDA/DARCOM REVIEWING ARMY-WIDE DISPLACED EQUIPMENT POLICY.
- DARCOM TOTAL PACKAGE/UNIT...MATERIEL FIELDING CONCEPT.

MAINTENANCE CHALLENGE

WHAT'S BEING DONE

- THIS CONFERENCE RESULTED IN 327 RECOMMENDED ACTIONS AND 43 CHALLENGES.
- MAINTENANCE MASTER PLAN FOCUSES ON SEVEN KEY ACTIONS:
  - THREE LEVELS OF MAINT.
  - EXPANDED MAINT TRNG.
  - MAINT CAREER MGMT.
  - LOG RQD.
  - DESIGN EQUIP FOR MAINTAINABILITY.
  - EMBRACE TOTAL ARMY.
  - ESTABLISH INTEGRATION MGMT ELEMENT.



MAINTENANCE CHALLENGE

to...ANTICIPATE and SOLVE

- SHIFT TO HIGH TECH MAINTENANCE.
  - M1 FIRE CONTROL AND TURBINE ENGINE TECH.
  - BRADLEY FIGHTING VEHICLE WEAPON SYSTEM.
- IMPACT OF PRINTED CIRCUIT BOARDS (PCBs) AND COMPUTER MICRO-CHIP TECHNOLOGY ON SUPPORT SYSTEM.
- NEW TEST MEASUREMENT AND DIAGNOSTIC EQUIPMENT (TMDE) AND CALIBRATION REQUIREMENTS.

MUST BE ABLE TO SUSTAIN NEW MILITARY CAPABILITY.

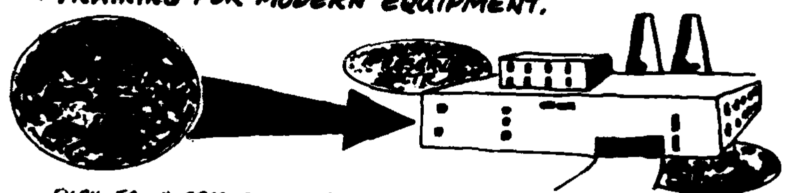
RC TRANS MOD CHALLENGE

to...ANTICIPATE and SOLVE

- PREPARING RC UNITS FOR WARTIME MISSIONS.
- RC MANPOWER, RESOURCES, FACILITIES, AND TRAINING TIME (38 DAYS ANNUALLY).

LIMITED...

- TRAINING FOR MODERN EQUIPMENT.



FY 84 EQUIP PROCUREMENT $1.13B AND $1B EQUIP DELIVERED IN FY 84 FROM PRIOR PROCUREMENTS WILL CAUSE STORAGE PROBLEMS.

RC CSS IS BACKBONE OF OUR MODERNIZED DIVISIONS...

RC TRANS MOD CHALLENGE

WHAT'S BEING DONE

- ALIGNMENT OF RC SUPPORT UNITS WITH COMBAT UNITS BASED ON CAPSTONE.
- PROGRAMING RC SUPPORT UNITS TO RECEIVE PROPER TOOLS AND TEST EQUIPMENT.
- PRIORITY FOR TRAINING RC SUPPORT UNITS WILL BE CONSISTENT WITH MODERNIZATION DISTRIBUTION.
- LOCATING STORAGE SUPPORT FOR RC EQUIPMENT.
- FUNDING FOR COMBAT ASL/PLL.

COMMAND and CONTROL CHALLENGE

to...ANTICIPATE and SOLVE

- WATERFALL OF DISPLACED EQUIPMENT.
- DEGRADATION OF NEAR-TERM READINESS.
- SHIFTING PRIORITIES & RESOURCES.
- KEEPING SA/CSA/VCSA INFORMED.

IN SUMMARY...

TRANSITION to MODERNIZATION

- TOTAL ARMY.
- REQUIRES INTENSIVE MANAGEMENT TO MEET LOGISTICS CHALLENGES.
- POSITIVE ACTION BY LOGISTICS COMMUNITY UNDERWAY.

DANIEL D. SEGAL
PRINCIPAL ANALYST
ANALYTICS

TEXT

Slide 1 Introductory subject of presentation

Slide 2 Organization structure and background

The Joint Tactical Fusion Program is a joint Army and Air Force program combining a number of related development efforts in the area of fusion and display of tactical intelligence information. The primary objective of the program is the development and fielding of All Source Analysis System (ASAS) for the Army, and Enemy Situation Correlation Element (ENSCE) objective system for the Air Force.

Background

The original Joint Tactical Fusion Program Management Office (JTFPMO) was organized in February 1981 by bringing together the assets of the BETA Project Office, a joint office developing the Battlefield Exploitation Target Acquisition (BETA) system; the Project Manager, Control and Analysis Center (CAC); the Project Manager, all Source Analysis System (ASAS); and the Program Manager, Enemy Situation Correlation Element (ENSCE). All of these programs involved the fusion of tactical intelligence information from one or more families of sensor systems. The Army was made the executive agent of the program, and the JTFPMO was jointly manned by Army and Air Force personnel.

During the ensuing two years, the ASAS program proceeded slowly.

In the face of an increasingly urgent need for all source intelligence fusion systems to support the AirLand Battle, the Army, as executive agent, moved to strengthen the program management office and streamline the overall management structure in order to expedite system acquisition. The result was a reorganized program management office headed by an Army brigadier general reporting directly to the Deputy Chief of Staff for Operations (DCSOPS), Headquarters, Department of the Army.

The new JTFPMO has several major responsibilities. First and foremost, the office is charged with the development, testing and fielding of the Army ASAS and Air Force ENSCE systems. In addition, the office retains overall responsibilities for the derivative systems of the former BETA project as well as the Army Technical Control and Analysis Center (TCAC). Through agreements with FORSCOM and the new Army Development and Employment Agency (ADEA), the JTFPMO has a major role in aiding in the development of the High Technology Light Division (HTLD) intelligence system at the 9th Infantry Division and in the Microfix program, as well. Finally, the JTFPMO has a lead role in establishing an overall architecture and transition plans for all tactical intelligence fusion systems, and in conjunction with the U.S. Army Electronics Research and Development Command (ERADCOM), is developing the Intelligence Electronic Warfare (IEW) subsystem architecture as a part of the Army Command and Control System (ACCS)

In placing responsibility for these several projects within the JTFPMO, the Army and Air Force staffs have assured that a single organization will orchestrate these interrelated programs, thus eliminating unnecessary overlap, duplication of effort and competition for resources. The ASAS/ENSCE remain the priority objective fusion system for both services, while the other efforts constructively support this overall acquisition program or are supported by it.

Slide 3 System Description

The ASAS/ENSCE is a highly deployable modular ADP system, which is part of the Command Control Subordinate System(CCS) architecture and supports the ASAS at Division, Corps, and Echelons above Corps (EAC) for the Army. The ENSCE provides the same support for the Air Force Tactical Commander. The system will be highly automated for fast data handling and will receive requirements; perform asset management and tasking; accept, evaluate, process, correlate, display, analyze and report on intelligence from all sources. The modules of a system will vary by echelon and service, and the system will be sufficiently mobile and redundant to provide continuity of operations during moves.

Slide 4 Integrated Systems Support

The definition of Integrated Systems Support (ISS) is extracted from HQDA letter 10-82-1, 30 September 1982 (Incl 2).

With in the definition of ISS, ILS is a subset of ISS. All factors relevant to the material acquisition and organizational development process are addressed by ISS. ILS is viewed as focusing on materiel acquisition associated with individual weapon systems. ISS expands considerations of manpower, personnel, training devices, and training on specific systems and provides for the integration of the fielding of numerous weapon systems at the same time. ISS also considers the impact on other materiel items and associated organizational structure and capabilities. HQDA and TRADOC dialogue normally refers to ILS as the vertical plane (integrating logistic support on individual weapon systems) and ISS as the horizontal plane (assessing the aggregate impact on the Army of fielding numerous weapon systems simultaneously).

Slide 5 Integrated Systems

Challenges:

With the requirement for multiple deployment configurations, the system has to be designed to meet the needs of the services at all echelons, service and a combination thereof. The echelon configuration addresses Division, Corps and Echelon above Corps. The service configuration addresses Army and Air Force while the combination configuration could address joint US-NATO or US-Korea.

The world wide deployment challenge would be a system capable of operating under any or all climatic conditions

The most difficult of the challenges is the development of a supportable system, modularized so that whatever the requirement, the system, in predetermined modular form can be used by a division (Light or Heavy), Corps, Echelon above Corps, ENSCE, by the Readiness Defense Forces or Tactical Air Command.

Slide 6 Integrated Systems

Opportunities:

The opportunities presented in the development of these systems could conceivably save a considerable amount of resources.

The means by which these savings can be realized are the development of:

A 3-level common maintenance concept, modularized to the lowest repairable unit (LRU) and accepted by the Army and Air Force.

A common training concept wherein training would be accomplished in a co - located facility with blue or green suit instructors.

Flexible common hardware modules.

Common Documentation and Standardization.

Slide 7 Maintenance Levels

The tasks that can be performed at the Organizational, Intermediate and Depot levels will be spelled out as the result of the Logistic Support Analysis and Logistic Support Analysis Record (LSA/LSAR).

The LSA/LSAR will also provide inputs to the development of Documentation, Parts, Training, Manpower, Test Measurement and Diagnostic Equipment (TMDE) and Standardization.

A single depot for both services could be possible through a Memorandum of Understanding and since the Army is the lead service, Tobyhanna could be the depot.

Slide 8 LSA/LSAR

The LSA/LSAR will be the analytical tool which will define system --

operating costs

Quantity and Quality of Personnel

Operating costs

Provisioning requirements

Logistic design influences

Support requirements

... and other areas through the iterative process of the LSA/LSAR.

Slide 9 Documentation

A single set of operator manuals, a single set of maintenance manuals and a single configuration management plan can be developed to avoid unnecessary costs of publication, distribution and training.

Slide 10 Training

It is proposed and planning is underway for a single location housing the ....

Post Deployment Software Support

The training facility for Maintenance, Operator and Supervisor training.

The joint aspects of the program will be the training of students and instructors from Army and Air Force with joint service manuals.

Slide 11 System Performance

A special joint service test and evaluation will be performed along with supportability and maintenance demonstrations and the reliability and maintainability of the systems.

Closing text ....

I have presented some of the problems and challenges associated with a multi- service program. There are additional problems involving the security aspect of the system which are unique and cannot be addressed in an unclassified meeting.

If there are any questions, ...

INTEGRATED SYSTEMS SUPPORT (ISS)

PROBLEMS ASSOCIATED

WITH

MULTI - SERVICE PROGRAMS

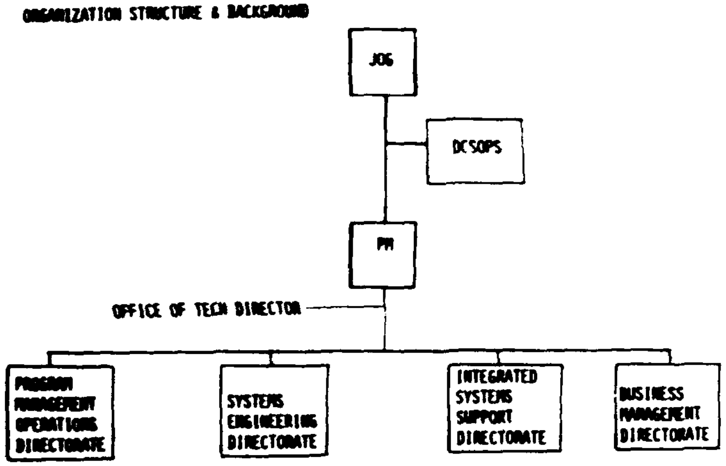
INTEGRATED LOGISTIC SUPPORT SYMPOSIUM
30 NOVEMBER - 2 DECEMBER 1983
FORT WORTH, TEXAS

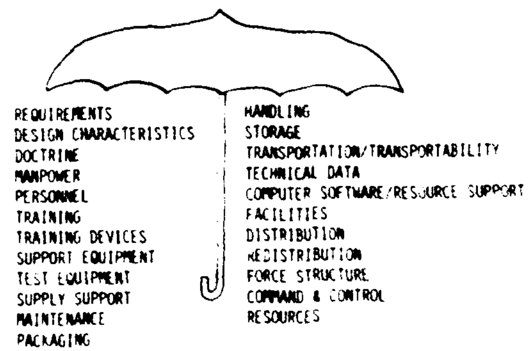
SYSTEM DESCRIPTION:

ALL SOURCE ANALYSIS SYSTEM/ENEMY SITUATION CORRELATION ELEMENT

- ASAS WILL SUPPORT ARMY, ENSCE WILL SUPPORT AIR FORCE
- TACTICALLY DEPLOYABLE MODULAR ADP SYSTEM
- HIGHLY AUTOMATED FAST DATA HANDLING
- RECEIVE REQUIREMENTS, PERFORM ASSET MANAGEMENT AND TASKING, ACCEPT, EVALUATE, PROCESS, CORRELATE, DISPLAY, ANALYZE, AND REPORT ON INTELLIGENCE FROM ALL SOURCES

ORGANIZATION STRUCTURE & BACKGROUND





INTEGRATED SYSTEMS SUPPORT

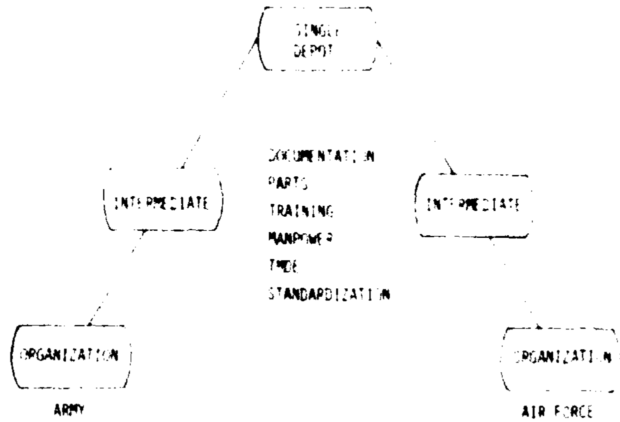
INTEGRATED SYSTEM...

CHALLENGES:

- MULTIPLE DEPLOYMENT CONFIGURATIONS
  - ECHELON
  - SERVICE
  - COMBINED
- WORLDWIDE DEPLOYMENT
- ACTIVE, RESERVE, RDF, TAC

...SUPPORT

MAINTENANCE LEVELS



DOCUMENTATION
PARTS
TRAINING
MANPOWER
TMDE
STANDARDIZATION

INTEGRATED SYSTEM...

OPPORTUNITIES:

- COMMON MAINTENANCE CONCEPT
  - 3 LEVEL
  - MODULAR
- COMMON TRAINING CONCEPT
  - JOINT
  - CO-LOCATED
- COMMON HARDWARE MODULES
  - FLEXIBLE
- COMMON DOCUMENTATION
  - STANDARDIZATION

...SUPPORT

LSA/LSAR

LOGISTICS ANALYTICAL TOOL TO DEFINE SYSTEM . . .

- OPERATING
- QUANTITY & QUALITY OF PERSONNEL
- HARDWARE COSTS
- PROVISIONING REQUIREMENTS
- LOGISTICS DESIGN INFLUENCES
- SUPPORT REQUIREMENTS
- ETC

. . . THRU AN ITERATIVE PROCESS

DOCUMENTATION

- SINGLE SET OPERATOR MANUALS
- SINGLE SET MAINTENANCE MANUALS
- SINGLE CONFIGURATION MANAGEMENT

SYSTEM PERFORMANCE

- JOINT TEST AND EVALUATION
- R & M
- SUPPORTABILITY DEMO
- MAINTAINABILITY DEMO

TRAINING

SINGLE LOCATION

- PDSS
- MAINTENANCE
- OPERATOR
- SUPERVISOR

JOINT

- INSTRUCTORS
- STUDENTS
- MANUALS

Conference Conclusions Recommendations and Observations

CONFERENCE CONCLUSIONS, RECOMMENDATIONS & OBSERVATIONS

The Conference Chairman requested each panel to submit their panel conclusions, recommendations and or observations for publication in the conference proceedings. He also stated that the conclusions/recommendations would be sanitized and forwarded to OSD/MRA&L and the Services DCS/Logistics for review and/or appropriate action. Listed below are panel and conference attendees submissions.

SESSION II DEVELOPMENTS IN LOGISTICS POLICY

RECOMMENDATIONS: PMs and selected warlords should be invited to attend the next ILS Symposium. Conduct tradeoffs on performance versus support in the pre-milestone zero phase. Get rapid feed back on the new LSA, LSAR implementation approaches, costs, problems, improvements. Task MRSA to collect experience data and to sumarize and disseminate. Establish visiability and priority on acquisition logistics personnel requirements and training needs to get high priority support. Establish responsibility in each service to review RFP/Contract to remove redundent bids. Use 1338 as a central service of data. Use funds saved to pay for front end trade-offs. Implement a new WBS for ILS management(Except early trades).

SESSION III SERVICE PROGRAMS IN LOGISTICS R&D

RECOMMENDATIONS: Improve standardization of definitions: (1) Logistics R&D and (2) Scope and details of programs. Put teeth in DSARC decisions (by DOD): (1) Hard criteria for ILS, (2) Demand pro-active planned programs, (3) Fail systems/programs that do not meet criteria. Produce minutes of ILS and ask for reactions by PMs. Suggest an immediate PM Meeting on their ILS programs, plans and progress.

SESSION IV LOGISTICS R&D IN INDUSTRY

ILS is an idea whose time has come. ILS has gone through the concept definition phase, is currently in the later stages of the demonstration validation phase, getting ready for full scale engineering development. Learning to compete for and acquire the funding for ILS is the current challenge which must be mastered. DOD policy and management personnel are now attaching the budgeting mechanism to bring reality to logistics in programs. A large part of ILS involves managing and processing of information. We are in the "Information Age". ILS must embrace and exploit those technologies which enhance our ability to process information.

SESSION V ILS FUNDING PANEL OBSERVATIONS

Internal service approaches to fund structures for ILS are not

as important as the credibility of the funding requirement and the support obtained during the budget process. Too many formalized budget/fiscal sub-program elements at OSD/POM level for ILS may be counter-productive in that they may reduce management flexibility and may write budget cutting on unnecessity narrow reviews of inherently "best-estimate" requirements formulation. Industry needs to advocate ILS, along with hardware, when it promotes its products in the Pentagon and on the Hill. Decision-makers in the program, budget, and resource allocation process must be accountable and responsible for actions which result in under-resourcing logistics support requirements. The impact of decisions on logistics supportability must be specified. The opportunity to, and advantage of, standardizing the contractual interface with industry by all services should be examined. Support is needed for efforts aimed at improving the preparation, evaluation, and understanding of ILS cost estimates.

SESSION VI CONTRACTING FOR ILS,OBSERVATIONS:

DARCOM PAM 700-21 a step in the right direction - but only a beginning. Its application to and use of the contracting process needs to be monitored and a feedback mechanism put in place to enable improvements/refinements. A. Have (how?) RFPs improved? B. Is the government/contractor definition of ILS requirements more successful? C. How about costs? Better estimates, more control, reasonable? D. etc. What have been the impacts of congressional/ OSD policies on paper work reduction, emphasis on DAR 6, etc. "NDI" is here to stay! Are we learning our lessons regarding tailored ILS for these systems? Is ILS receiving adequate evaluation and importance in the source selection process?

SESSION VII ILS AND THE ASSURANCE SCIENCES

(1) Industry is taking positive action to improve the quality of products they produce while striving for cost reductions of their product. (2) Heavy emphasis is being placed on proper and timely considerations of ILS and the assurance sciences during the development of new weapons to ensure cost effective support and improved mission readiness. (3) A need exists to set up a data return system so that the contractor has quick access to fielded feedback for use in corrective action and future improvement. (4) Innovation in design is becoming increasingly important because of the increased production rates and high tech sophistication of today's weapon systems. Traditional solutions will not be adequate. (5) Continued and strengthened emphasis on standardization is another high pay off reducing the supportability burden. (6) There is a rapid and dramatic growth in software and software maintenance costs that must be subjected to organized improvement. (7) The ILS and assurance sciences interface is no longer (if it ever was) important. Both disciplines must work as intermingled complementary entities. Recommendations: Work hard to identify, justify and defense up from funding for innovation in design and prevention of error in production. Establish an organized field data collection system that provides timely feedback to the producing contractor.

GENERAL OBSERVATIONS FROM ATTENDEES:

We are preaching to the choir-attendees are almost exclusively logisticians. Recommendation: to invite program manager and commanders to future ILS programs.

Logistics is undergoing a very dynamic period with significant progress in policy and priority. Implementation is not keeping up! Recommendation: Greater emphasis on timely implementation.

Logistics R&D is not fully integrated with RDT&E Plans. Recommendation: The military service should integrate logistics R&D into RDT&E plans and funded in priority with potential payback.

ILS Funding lacks program funding. Recommendation: Develop appropriate model to provide timely forecasts of ILS funding requirements.

Some logistics problems will require unconvential solutions. There is a built in resistance which inhibits adoption of unconventional solutions. Recommendation: Further study is required to determine ways to streamline system so innovative solutions are acceptable.

Congress needs to be brought into loop on requirement for supportability funding. Recommendation: Industry associations should cause Congress to become familiar with impact funding constraints on supportability.

Services are looking to industry for help to make systems more supportable. Yet, contract award process overstructures effort with a myriad of standards, DID's etc. More latitude for innovation is needed. Recommendation: Make appropriate changes to acquisition process.

Front end process not adequately addressed regarding formulation of ILS goals/requriements. Recommendation: Panel on ILS Requirements formulation for systems in Pre-Milestone Zero.

Industry "program manager" function assumed to start in Pre-Milestone Zero time-frame; this function is normally handled by a proposal/study manager (or IR&D team leader). Recommendation: Panel on Incentivizing industry to provide adequate ILS response.

Industry unclear on how to get funding for ILS R&D applications. Recommendation: Focus more attention on the mechanics of the pre-milestone zero process (on both military and industry sides).

Major elements of a strategy to substantially improve supportability in new acquisition - starting with front-end, cost vis-v control, technology advances in the support areas (funded R&D and IR&D). Recommendation: Must be treated as systems approach with all the above.

Need more support from OSD, Service Secretaries and Logistic Commanders. Recommendation: Require logistics R&D advocates to get in the mainstream and tell industry where the dollars are allocated. Intensify cost control and include industry interface, develop better cost estimates, tools.

The ILS community must be more vigorous in stating its case. It must get the true attention of the design community - complete interplay. Recommendation: Carry the message outside the ILS community standardization and other advantages to support must be pushed for the ILS community. The designer has no/little incentive.

There is strong evidence of progress (the Army pamphlet and regulations the contracts for packaging studies, standardization at the module level, the "similar" funding, tracking schemes of the services) toward organization in the ILS world - but it appears to be uneven. Recommendation: Try to stay simple but under control.

There is a need for more & better communication within the ILS world, both across service lines and across functional lines; the assurance science people, the inventory control people, the trainer, etc. Recommendation: More symposiums like the ADPA's Integrated Logistic Support Symposium.

x-

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